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Illyrian Coastal Exploration Program The 2009 Campaign

Overview

Fieldwork along the eastern Adriatic coast in 2009 marked the initial campaign conducted and coordinated under the research initiative of the Illyrian Coastal Exploration Program (ICEP). The goals of the program, introduced in this

FIG 1
Overview of the survey areas for the 2009 field season.
J. Royal, RPMNF.

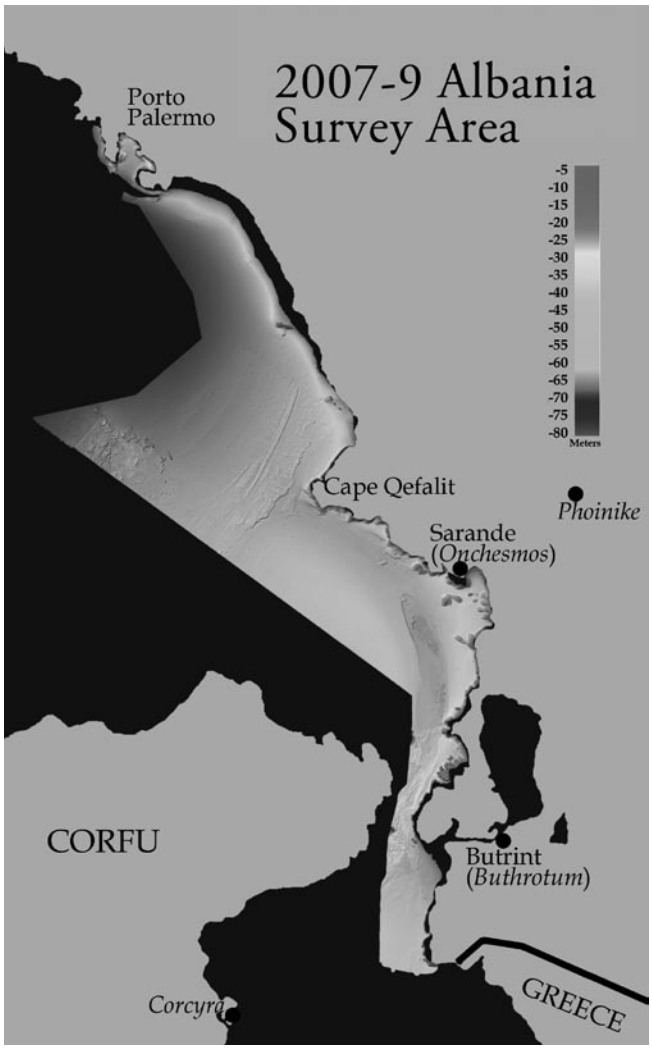


FIG 2
Multibeam coverage from 2007–9 in Albania Map by J. Royal, RPMNF

publication (Royal 2009), are to bring together numerous research institutes in an effort to investigate the eastern Adriatic coast. At the core of this program is a survey of the littoral region, out to the c. 100-m contour, spearheaded by RPM Nautical Foundation (RPMNF). The goal of the survey is to document all submerged cultural finds in an effort to assist the countries involved with the protection and scholarly research of these finds. This process is underway in Albania and Montenegro, and efforts are underway to organize fieldwork in Croatia for 2011. Among the entities involved in the program are the Albanian Ministry of Culture and Tourism, Albanian Institute of Archaeology (AIA), Butrint National Trust (BNT), Montenegro Ministry of Culture, Regional Center for Underwater De-Mining (RCUD), Montenegro Center for the Protection of Cultural Heritage (CPCH), Institute of Nautical Archaeology, Trinity University-San Antonio, U.S. Embassy-Montenegro. Efforts of many individuals make the program possible, among them are Dr. Adrian Anastasi (AIA), Co-Director in Albania, Auron Tare (BNT), Veselin Mijajlovic (RCUD), and Dr. Vilma Kovacevic (CPCH).

Survey Plan

Survey operations with a hull-mounted multibeam sonar were undertaken during May and June by RPMNF's R/V *Hercules*. Detailed bathymetric data was collected first in Albania then continued in Montenegro (Figure 1). Overlapping survey lanes along the contours of the seafloor ensured 200% coverage of the seafloor and the ability to detect anomalies. Anomalies were verified primarily with a Remotely Operated Vehicle (ROV) operated from the R/V *Hercules*, except for a few in shallow areas of c. 5-35 m of depth where divers were utilized in Albania. Once the research vessel was positioned over an anomaly location, the ROV was deployed. A forward-scanning sonar affixed to the ROV facilitated the location of each anomaly and aided in the examination of the area surrounding each anomaly for scattered objects. Each site or submerged find was recorded with the ROV's multiple video cameras. When deemed necessary, and conservation facilitates were available, objects were raised to assist in determining the date, provenience, and nature of the site or find. When geologic formations were encountered, they were scanned for cultural material that often is trapped when drag nets or currents push them onto rocks.

In addition to the multibeam survey, diver investigation was conducted in selected near-shore areas of Albania in order to gain an understanding of the presence of shallow-water material cultural. The dive team was expanded during the 2009 field season with the participation of volunteers from numerous organizations. Diver investigation included sections of coast all along the survey area. No beacons were attached to divers during operations; however, the locations of the dive boat, buoys placed at the furthest extents of the survey, and buoys at finds were recorded. Divers were armed with amphora

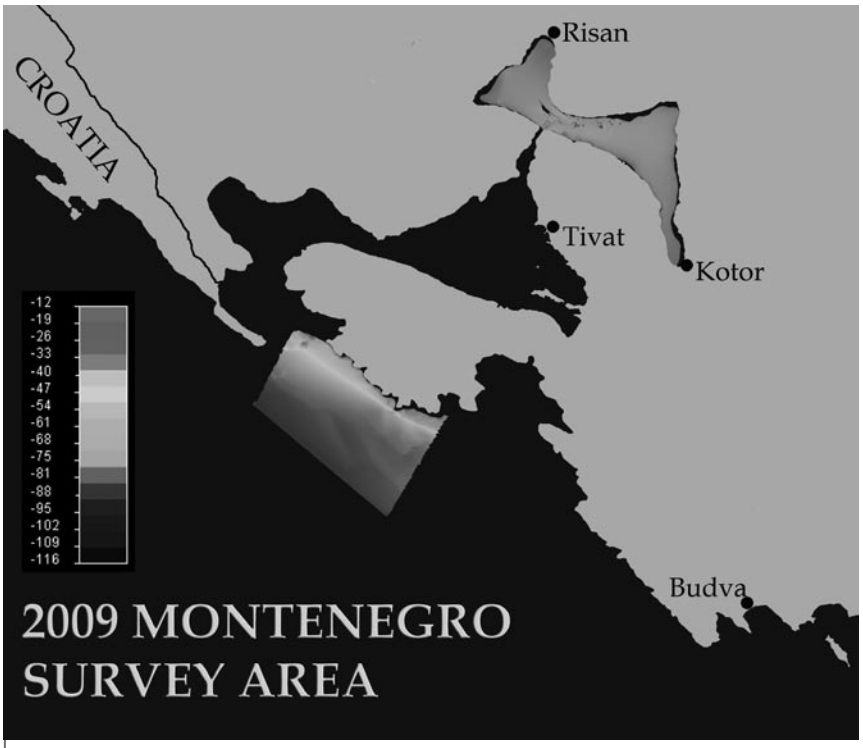


FIG 3 left
Multibeam coverage for 2009 in Montenegro. Map by J. Royal, RPMNF.

FIG 4 opposite
The Gjergantas Bank formation and position of the Joni wreck site in IVS Fledermaus; note the site's anomaly image in the lower left corner. Graphic by J. Royal, RPMNF

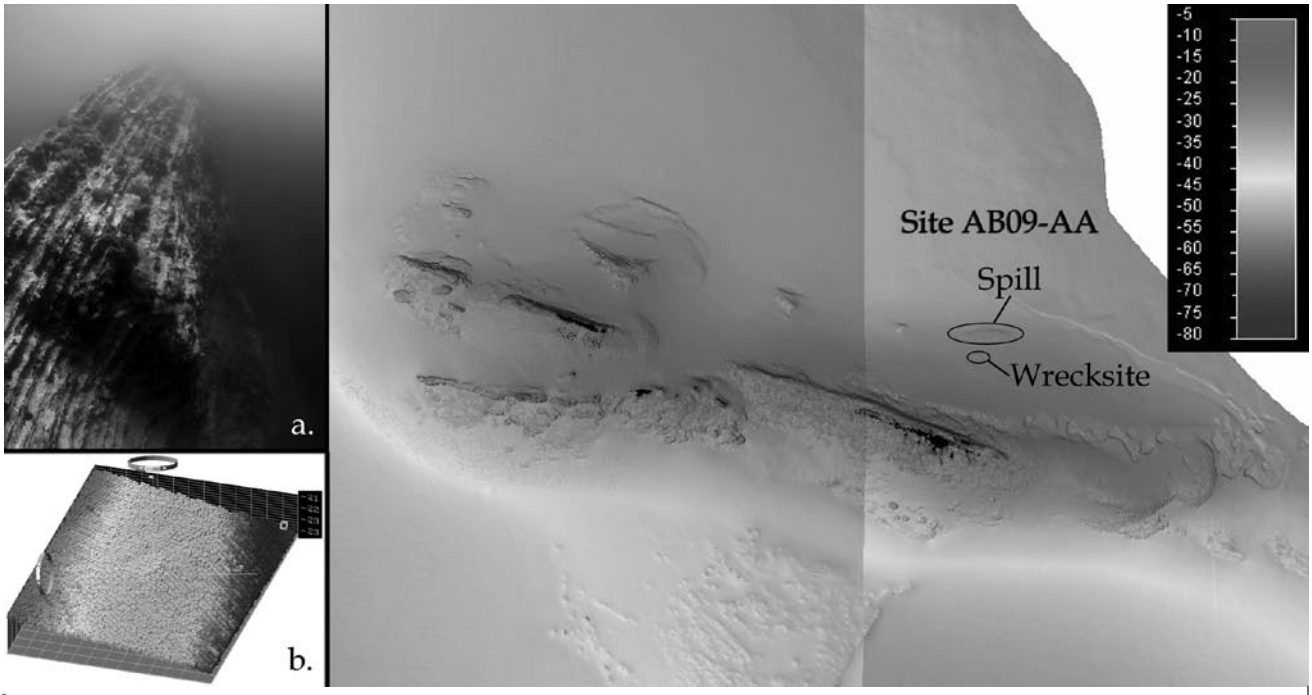
identification slates, still cameras, scales, and drawing slates for recording finds.

In Albania, the 2009 multibeam survey addressed gaps and unfinished areas within the section surveyed during the 2008 season, and subsequently continued northwards (Figure 2). From the southernmost point at the Greek border, the survey has progressed northward to Porto Palermo in three seasons, a distance along the coast of c. 50 km.[1] Once the operation progressed north of Corfu (Greece), it was possible to extend the survey area further offshore out to the c. 80–100 m contour. The survey plan formulated for Montenegro for this inaugural season was based on the areas of interest of RCUD and CPCH representatives, particularly the bays of Kotor and Risan (Figure 3). Founded in the 5th century BCE, the city of Risan includes remains from the Illyrian and Roman eras as well as the medieval period. Additionally, the survey of the outer coastline began with the area directly opposite the entrance into Tivat Bay (Boka Kotorska) and extended Cape Mačka. Combined the surveyed areas of Kotor and Risan Bays was approximately 28 km^2; the bays have a general depth of c. 30 m with a maximum of 60 m in spring holes. R/V *Hercules* approached very close to shore in some sections and also passed in depths as shallow as 12 m. The coverage area on the outer coast was c. 32.5 km^2 and ranged from 17–100 m.

Data from the multibeam operations was processed during, and directly after, the collection phase to produce three-dimensional models of the seafloor, which was then analyzed for anomalies.[2] Anomalies were examined for association with either geologic formations or deposits consistent with shipwreck sites, the latter were plotted for verification. Once mapped out in navigation and spatial recording software, the R/V *Hercules* navigated into position over anomalies and the ROV equipped with a transponder was deployed.[3] The software also allowed the real-time tracking of the R/V *Hercules* and ROV within a three-dimensional seafloor model, and to obtain precise locations for sites and random finds. During verification operations, the locating of each anomaly, as well as stray material near anomalies and sites, was facilitated by a forward-scanning sonar affixed to the ROV. Once cultural material was located and positions recorded, a visual investigation ensued through the use of still and video cameras. Scale was provided with a laser affixed to the ROV that provides two 10-cm spaced points.

Geologic Findings

After completing the processing of data acquired during 2009 in Albania, ands its collation with previous season's, the areas north of Saranda around Cape Qefalit and extending northward possess a large number of rock formations in the deepest sectors of the survey area. Some formations near the cape form linear patterns extending tens of kilometers, while the formations further from shore are more heterogeneous in size and pattern. These rock formations do not appear within 5–6 km of shore N of Cape Qefalit, where they are apparently buried under sediment layers. Ascertaining the possibility of rapid and massive geologic modification



of this area is beyond the scope of this report. However, once multibeam lanes were run in a roughly E-W direction (perpendicular to shore) just to the N of Cape Qefalit in order to adjoin the 2008 multibeam coverage, the surveyors noted that depths indicated on the current charts in use for this section of the Albanian coast were in error. Actual depths were much greater for the position on the chart; for example, areas recorded as c. 90 m of depth were actually 75-m deep. Hence, the area possible to survey is greatly extended from shore than was indicated during the planning phases of the field season based on chart data. This increased area requires a greater time commitment to complete; consequently the survey did not reach out to the 100-m contour in the Porto Palermo area. Coverage was completed to Porto Palermo out to the 40-50 m contour in order to allow room for vessel maneuvering and free the surveyors to plan the most efficient lanes for covering the area. This inconsistency between the depths indicated on the charts and the actual multibeam depths has two possible explanations: the charts are in error, or there has been a large amount of sedimentation in this area that has dramatically changed the seafloor topography.

Other evidence that indicates discrepancies in the survey for charting purposes and ICEP data is for the large rock outcrop near shore (Gjergantas Bank) that extends to within c. 2 meters of the surface in several places (Figure 4). This obvious navigation hazard does not extend to shore as indicated on charts. Recent work along the Croatian coast indicates the eastern shore of the Adriatic is undergoing subduction at varying rates. Combined with the sea-level rise over the past several millennia, submerged Roman-era structures indicate an overall rise in relative sea-level from 1–3 m. Given this difference in historical sea level, the Devil's Tongue formation must have presented a particularly dangerous navigation hazard in antiquity.

As noted above, the bays of Risan and Kotor were intensively surveyed to assess the potential for archaeological finds. A review of the data produced interesting results for understanding the nature of the seafloor. The bottom is at a consistent depth of c. 30 m, gradually decreases in depth at the towns of Risan and Kotor, and is composed of a soft, silt stratum on the surface. In the central portion of this bay system are numerous fresh-water springs fed from the surrounding mountains that rise to over 800 m. These springs maintain large craters formed in the seafloor with depths from 45–60 m, which demonstrate the vast amount of sediment deposited from the wash off the surrounding peaks. Tidal and circulatory currents as well as seasonal storm action move the sediment out of the bays to the coastal entrance where it dissipates southward down the coast.

Sites and Other Finds

Modern Sites

Three modern wreck sites were discovered during the 2009 field season, all of which are in the coastal section of Montenegro. A submarine (site MN09-AA) was partially buried in the silty bottom near the entrance of Boka Kotorska. This c. 30.5 x 7.0 m vessel

has large sections of the outer plating missing, some of which appears torn away. There are at least two torpedo tubes along the NE side of the vessel, a large hatch or gun emplacement positioned along the vessel's top at the NW end, and at the SE third is a likely coning tower. A review of the WWI and II-era submarines in the Maritime Museum in Kotor provided several good matches for dimensions and features.[4] A second military craft (MN09-AB), measuring c. 39.0 x 7.5 m, was discovered just south of the previously discussed submarine. It sits upright with a large amount of structure visible, although the remaining height of the structure is not great. A narrow length-to-beam ratio and metal construction indicates a swift vessel of the early-mid 20th century; it has similarities to the torpedo boats known to have operated in this area. The final modern wreck site (MN09-AC) is also a modern war vessel located near the previous two, probably constructed of aluminum, and has a shape consistent with a fast patrol craft. There are apparent blast holes at the bow and stern of this c. 38.0 x 8.5 m vessel. The wreck sits nearly upright at the fore section but twists to its port in the a-ft section where the bottom of the hull is visible. Poor visibility due to the sediment outflow from Boka Kotorska made identification difficult; yet it has many features of communist-era patrol craft, many of which were of Chinese manufacture.[5]

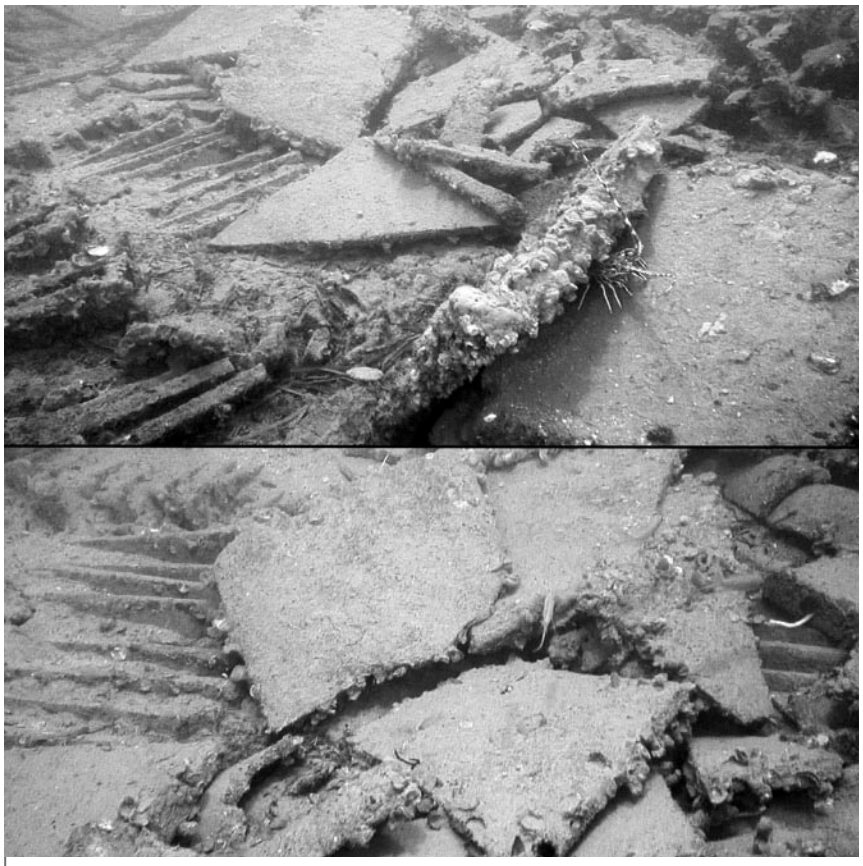
Ancient Sites

Verification of multibeam anomalies produced three Roman-era wreck sites, one in Albania and two in Montenegro. Considering the natural hazard presented by the Gjergantas Bank along the Albanian coast between Cape Qefalit and Porto Palermo, anomalies were carefully explored. Divers were used whenever possible due to the obvious hazard for the R/V *Hercules*. Examination of an anomaly at c. 23 m of depth on the inner side of the rock formation produced a

FIG 5
Divers recording the Joni wreck site. Photograph by D. Smith, RPMNF.

FIG 6 inset
An African 3C amphora on the Joni wreck site. Photograph by D. Smith, RPMNF.

FIG 7 opposite
Images of the Boka Kotorska 1 wreck site. Courtesy RPMNF.



well articulated and largely undisturbed wreck site: the Joni wreck (Figure 4-5; site AB09-AA). The principal portion of the site, a c. 9 x 4.5 m oval, is formed by 3–4 layers of intact amphoras. Approximately 20 m down slope of this primary deposit is a fan of broken ceramics that runs c. 15.5 m in length. No artifacts were raised for analysis during the season as it was decided that proper conservation facilities were not available. However, the shallow depth and good visibility allowed excellent image documentation and *in situ* measurements.

On initial examination, the cargo is primarily amphoras of type African 3A-C (Figure 6); however, there are also Late Roman 1 and 2 examples present as well. There is much variation in the rims within the three African 3 sub-type that often makes differentiation difficult; however, the intact examples provided additional identification traits such as the more slender bodies of the African 3C sub-type and the bulbous form on the base spikes of sub-type African 3A. The latter two types of Late Roman amphoras have an E Mediterranean origin and were present in the upper portion of the intact main deposit and the spill deposit, apparently loaded on top of the N African amphoras. As such, the preliminary assessment of the cargo origin is N Africa, probably Tunisian, with possible port calls along the western coast of Greece before it sank here in the 4th century CE.

The Joni wreck is one of two found in this project that date to the Roman or late Roman era, both with N African cargos; a supposed Roman-era wreck located north of the Butrint River mouth located in the late 1990s is un-substantiated. [6] A wreck discovered the previous season, site AB08-AH (Butrint 2 Wreck) carried Tripolitanian 1 type amphoras dated to the 1st–2nd centuries CE. One of the areas of inquiry raised by these two sites is the routes of goods moving from N Africa into the Adriatic. Routes from N Africa are traditionally believed to run along the S coast of Italy; however, these two Roman merchantmen point to another route through the straits of Corfu and, consequently, a more easterly initial route from the African coast.

One of the two Roman-era finds found in Montenegro was a somewhat large wreck site, a c. 25.0 x 7.0 m primary deposit, which features a cargo of roof tiles (Figure 7). The site is located approximately one km from shore in the open seafloor, and has undergone impact from fishing activities as evidenced by the large fishing net snagged on the tiles. Both flat pan tiles (tegulae) and curved cover tiles (imbrici) were present on the Boka Kotorska 1 wreck (site MN09-AD), the former were much greater in number. Many of the tiles remain in a stacked position, shifted as the wreck settled and decayed, and are intact. At least three long rows of tiles are noted running along the site's long axis.

A complete pan tile (Figure 8; artifact number MN09-0001) and a cover tile were recovered for documentation. The tegula was c. 63 x 47 x 2.5 cm, comprised of a dark red fabric and possessed flanges oriented at 90° to the flat pan surface. Notches cut into the flange's upper portion at the forward, and lower section of the rear, ends facilitated their overlapped stacking on roof tops. Both the tegula and imbrix were nearly iden-tical to ones recovered during dive survey along the Corfu Strait in Albania during this same season. Such tiles are difficult to date on their own, although there are assuredly stamped tiles within the cargo that would facilitate dating; however, they are of the form common to the early Imperial period.

Similar tile wrecks are fairly common in the shallow waters investigated thus far in Croatia. Tile production was minimal in the eastern Adriatic during the 1st–2nd centuries CE, the initial organization period under Roman rule. During this period, tiles were shipped into eastern Adriatic port cities to supply building projects. By the end of the 2nd century CE onwards, the local production of tiles was developed and

decreased overseas demand. Although it is impossible to determine the exact date and provenience at this time, the wreck was very possibly carrying tiles from workshops on Italy's Adriatic coast operating during the early imperial period, a time when heightened imperial family and senatorial involvement in the industry is recorded.

A second wreck (site MN09-AE) of the Roman era was located near the entrance at Boka Kotorska that carried a large shipment of amphoras (Figure 9). The Boka Kotorska 2 wreck site was somewhat spread out, 20 x 17 m, due to apparent hits by fisherman's drag nets. The amphoras in the central portion of the site have fallen in an organized pattern from their stacking arrangement and are mostly intact; many are buried to a large degree. Those amhoras on the outer sections of the wreck are damaged with numerous sherds scattered around, their orientations are inconsistent, and often sitting more atop the sandy seafloor. It would seem that some of these amphoras were dislodged from a more organized deposit and damaged by drag nets. Based on the visible amphoras, the majority, if not all, of the cargo is of Lamboglia 2 amphoras that date from the early through end of the 1st century CE. A single amphora was raised for analysis (Figure 10; artifact number MN09-0003). Although marine growth rendered them unreadable upon recovery, a rectangular stamp is located on the lip and the stopper that remains in place has relief lettering and/or designs; this stopper also had a center knob. Similar stoppers, published by CPCH, have been found in Risan and Kotor bays. Likewise there are examples of Lamboglia 2 amphoras in the Kotor Maritime Museum and the Lady of the Rock Museum in the center of the bays. This wreck carrying Lamboglia 2 amphoras, particularly those with this type stopper, was likely enroute from somewhere in central Dalmatian coast, as recent research indicates this was the production area for this type particularly at Vis and Narona in Croatia.[7]

FIG 8
Roman tegula from the Boka Kotorska 1 wreck site. Photograph by J. Royal.

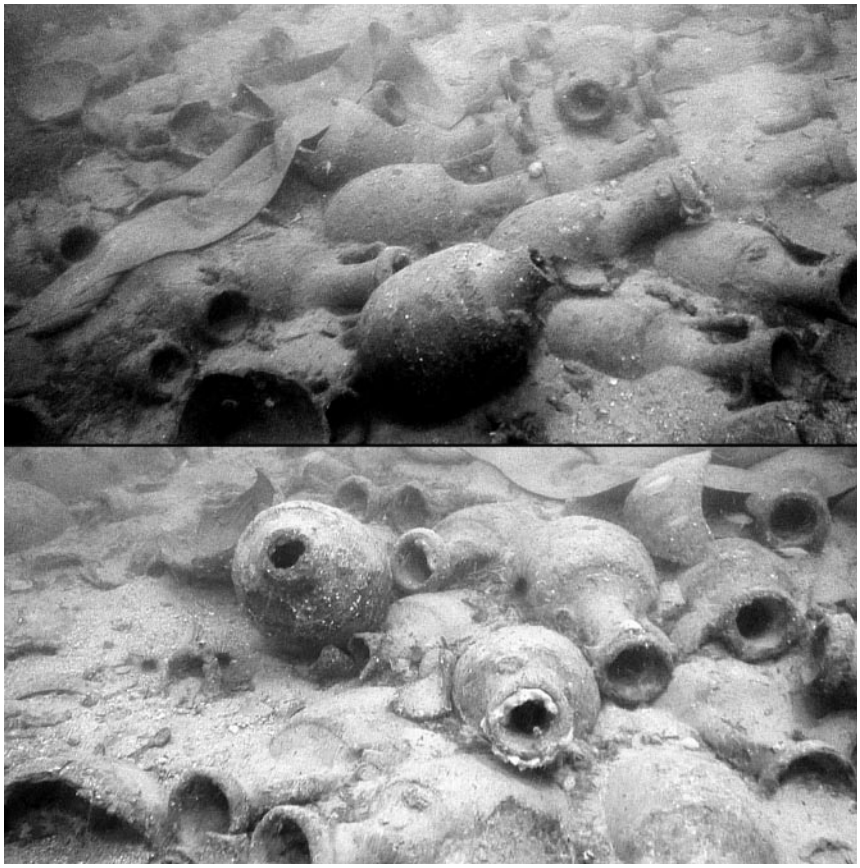


FIG 9
Images of the Boka Kotorska 2 wreck site. Courtesy RPMNF.

Current work in Risan and Kotor Bays is more difficult. There were 55 total anomalies in both bays and their investigation indicated geologic formations or modern debris. ROV operations were also conducted near Risan along the eastern shore where amphora fragments have been reported. Several amphora fragments and a possible whole buried amphora were located in the area, but no other finds were made in a wider search. Likewise, the multibeam data showed no evidence of architecture above the surface in the area where the ancient city of Risan purportedly sank into the bay.[8] From the bottom conditions observed, it is clear that a large amount of sediment has buried ancient finds, and what has not been buried has been taken by the many years of looting in the bays. Local reports indicate the Yugoslavian army posted divers here for decades who had little to do but collect artifacts in the shallow bays. Other reports indicate individuals conducted regular looting of the bays as an illicit business in trafficking artifacts or selling 'antiques'. This situation underscores the necessity for a comprehensive survey of Montengro's submerged cultural resources as part of an overall management and protection strategy.

Supplementary Wrecksite Efforts

Along with ROV operations to verify anomalies in Albania, two sites discovered in the previous season were visited for mapping with a new camera configuration and the use of new lights attached to the ROV's deployment cage. Both the Rodon wreck (AB08-AF, late 6th–5th BCE) and the Qefalit Tile wreck (AB08-AG, 4th BCE), which carried Corinthian cargos were video recorded. Given the additional lighting and camera configuration, the imagery improved from the previous season and it was possible to develop a workable photo mosaic for producing site plans. Additional amphoras were noted on the Rodon wreck protruding from the mud. To further the analysis of the Qefalit Tile wreck, an additional flat tile and the first cover tile were recovered from the site. This second pan tile collected from the site was intact, unlike the one from 2008, and measured c. 81 x 51 x 2.3 cm. It was found flat on the seabed with its upper surface settled into the sand. Upon recovery it was noted that its upper surface that was pushed into the sand was covered with heavy, older shell growth that was now deceased, while there was much less growth on the exposed bottom surface. Hence, the tile was relatively recently moved from the pile, perhaps the last 10-15 years, and flipped over onto the seabed; the dragnets in this area and at this depth are the most likely mechanism to have causee this disturbance.

Additional photos and measurements were taken of the amphoras at the Butrint 2 wreck site (AB08-AH, 1st–2nd CE) in Albania, and investigation revealed more of the amphoras were visible than in the previous season; perhaps the different time of season incurs sediment removal at this time. The additional fragments were consistently of type Tropolitanian 1, the only type noted at the site thus far. Although it is not certain, a fragmentary African-type cylindrical amphora located some 100–125 m to the N of the site may be a Tripolitanian 1 as it exhibits a constricted waist and a similar toe. Supplementary video was taken of a modern site discovered in Albania in 2007 as part of an investigation into the remains being that of the *Volage*, a British warship damaged in the area in 1946. Its archaeological investigation is lead by Dr. Delgado of INA and a preliminary report has been published.[9]

Shoreline Dive Survey–Random Finds

Over the course of the field season in Albania a dive survey was conducted along the shallow waters of the shoreline. Areas were defined by weather, accessibility, time constraints, and experience from the previous two seasons. As such, the coverage was neither systematic nor fully based on random sampling; hence, some statistically-based conclusions are difficult to draw. However, the significant area covered over the past three seasons, and that all sections of the coast in the survey area have been explored, do provide a useful sample. The remains are likely the primary result of jetsam as ships passed into and out of the Corfu Straits; hence they present themselves as random finds on the seafloor. The lack of recreational diving in Albania has maintained this record of random finds, one of the few places in the Mediterranean where such finds survive at diver depths. A few other random finds were discovered during ROV operations, yet the majority were documented in dive operations.

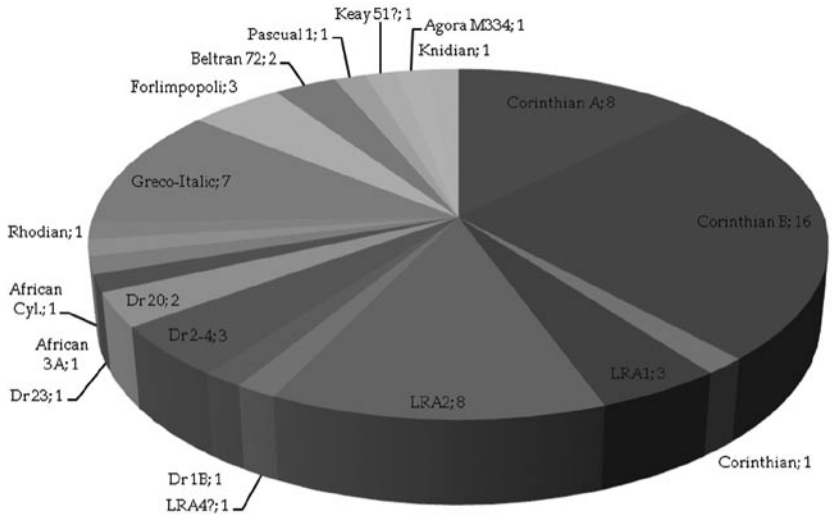
A majority of random finds are either intact, or nearly intact, amphoras and were located from the Greek border to the southern end of Sarande Bay, particularly south of the entrance to Butrint. In addition to amphoras,

FIG 10
Lamboglia 2 amphora from the Boka Kotorska 2 wreck site.
Photograph by J. Royal.

tableware from many eras is frequently encountered as well as various lead anchor stocks. Finds in Sarande Bay were scanty, and from the nature of finds from the late medieval and later periods, it appears that heavy silting in this bay has buried much of the earlier evidence. All random finds of amphora types are provided in Graph 1. Corinthian amphoras were the most commonly found, and type B Corinthian amphoras were twice as prevalent as type A. Late Roman amphora types were also common finds as were Greco-Italic amphoras from the Hellenistic era.

The numerous examples of Corinthian amphoras speaks not only to the primary route through the Corfu Straits for merchantmen carrying goods further north, but also suggests this traffic was heavy and of a long duration. These finds underscore the evidence provided by the five shipwrecks carrying Corinthian goods thus far discovered. Within the long history of this traffic, both sets of evidence indicate the heaviest shipping during the 4th–3rd centuries BCE. This is also the period where a significant representation of Greco-Italic amphoras is noted in the sample.

Whereas amphoras produced in the Adriatic such as Lamboglia 2/ Dressel 6, and Forlimpopoli types are common finds along the Croatian and thus far on the N Montenegrin coasts, only the Forlimpopoli type amphoras are well represented along the southern Albanian coast. During the 2nd–3rd century CE, Forlimpopoli type amphoras are common at Butrint, Durres and a number of E Mediterranean sites where their directed shipment was predominant. The working theory is this differentiation in finds is based on routes. Whereas ships coming out of the Adriatic heading east, commonly those carrying Forlimpopoli amphoras, would come through the Corfu Straits, while those merchantmen carrying Lamboglia 2 amphoras were headed more often to W Mediterranean ports and therefore crossed over to S Italy before reaching Corfu. Ships with Lamboglia 2 amphoras could run the eastern coast of the Adriatic to a point near Apollonia before crossing over to Italy; hence, further documentation of finds is crucial as the survey continues in both Albania and Montenegro.



Graph 1. Amphora types discovered during diver survey, 2007–9.

Bio-Archaeology Research

In an effort to increase the ICEP's scope, the addition of innovative biological research into marine archaeological sites is sought. Marine biological research will focus upon biological community structure and diversity of submerged cultural sites in the study area that vary significantly from one another as well as provide comparative material for those in surrounding areas. Continuous measurements of salinity, pH, and dissolved oxygen will be taken at selected sites, and when possible will also include light levels, current profiles, wave height, and tidal range. The study will also utilize the placement of recruitment plates for obtaining colonization data on ancient wreck sites, the first of which is the Butrint 1 wreck site in Albania. Collected data will allow for inter-site comparison, establishment of a baseline for the monitoring of sites, and factor into protection and management decisions. It is envisioned that such participation of marine biologists and oceanographers will lead to recommendations and implementation of management plans for marine protected areas that include heritage sites. This effort is led by Derek Smith, who is currently finishing his MS at University of Hawaii's Zoology Department. Mr. Smith will be entering the Biology Department's PhD program at the University of Washington in the fall of 2010, and is an RPMNF/ICEP research associate. His focus is the study of biological communities specifically associated with submerged cultural resource sites and is at the intersection of ecological, archaeological, and oceanographic disciplines.

Works Cited

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Lindhagen, A. 2009. "The transport amphoras Lamboglia 2 and Dressel 6A: a central Dalmation origin?," *JRA* 22:83–107.

Notes

1 During the 2008 field season the bay of Porto Polermo and its entrance was completed.

2 Multibeam data was acquired through Kongsberg's SIS software, processed in CARIS HIPS/SIPS, and modeled in IVS Fledermaus software for anomaly analysis. All acquisition and processing of data was performed by surveyors contracted from Highland Geo Solutions Inc. of Fredericton, NB, Canada.

3 IVS kindly provided a prototype software module that allowed the tracking of all vessels within the 3-D models of the seafloor in Fledermaus.

4 Although it is not clear from the evidence if this was the scuttled Austro-Hungarian submarine U-72, the German U-24, or whether a British submarine (possibly the H2) that was also lost in the area.

5 Not only were modern war craft a common find, but a spent missile was also found in target confirmation. There have been many tons of munitions from the various 20th-century conflicts removed from Montengro's waters by the RDMC; however, all of the finds discussed here were at depths over 60 m.

6 The heavy concentration of Roman and Late Roman-era amphoras littering the seafloor, some of which are intrusive on Archaic-Hellenist Greek wreck sites, probably led to confusion.

7 Lindhagen 2009.

8 If it did recede under the water due to sea-level rise and possible subduction, then heavy sedimentation has long covered any remains; some of Risan's ancient remains are reported to have been build over when the new dock at Risan was completed.

9 Delgado 2009.

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Revisiting and Early Naval Incident of the Cold War: Archaeological Identification of the Bow of HMS *Volage* Sunk During the Corfu Channel Incident of October 22, 1946

HMS *Volage*, from Pingbosun, Destroyers Second Album, Picasa.

Volage, in harbor, showing bow damage, from Pingbosun. Destroyers Second Album, Picasa.

Introduction

Following the Second World War, Britain asserted that the Corfu Channel, a narrow seaway separating the island of Corfu from the Albanian coast, was an international strait. Albania, at that time a Communist State under the leadership of Enver Hoxha, came into conflict with Britain over the right of passage. Three separate incidents ensued in 1946. Britain claimed free transit through an international waterway, citing the doctrine of innocent passage, and Albania