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Just Add Water

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The State and Prospects of Archaeological Underwater Research as a Part of the Project *Vistula Underwater Heritage of Warsaw and the Surrounding Area. Recognition of Underwater Archaeological Sites as a Part of AZP[1] Research*

Artur Brzóska[*]

Aleksandra Chołuj[**]

Piotr Prejs[***]

Andrzej Szerszeń[****]

Abstract:

In this season a new project will be launched, which is a continuation and complement to earlier research activities undertaken on the Vistula waters in different years. A group of experienced divers and archaeologists received funding for the non-invasive prospection of a selected section of the Vistula River. The main aim is the detailed observation of the riverbed in the selected area by using high frequency side scan sonar. The project is planned to be completed by the end of this year.

Keywords:

underwater archaeology, Vistula River, side scan sonar, recognition, non-invasive prospection

Introduction and Background

Underwater investigations on the Warsaw section of the Vistula River have been already carried for several years. Following the interest a team of archaeologists and divers under the auspices of the Association of Archaeologists of Tomorrow (Polish: *Stowarzyszenie*

[1] AZP in an intialism for Polish *Archeologiczne Zdjęcie Polski*, an initiative realized throughout Poland since 1978, including searching for, registering, and georeferencing archaeological sites. The main goal of the project is to obtain information needed for scientific and conservation purposes, related to the protection of heritage. The search for archaeological sites is mainly conducted using the field prospection in spring and autumn. In addition, information from archive studies and interviews with residents of a given area are used.

[*] M.A.; Institute of Archaeology, University of Warsaw; e-mail: brzoskaarturo@gmail.com.

[**] M.A.; Institute of Archaeology and Ethnology, Polish Academy of Science; e-mail: aleksandra.choluj@gmail.com.

[***] M.A.; Association of Archaeologists of Tomorrow (SAJ); e-mail: prejs.p@gmail.com.

[****] M.A.; Sonars.pl; e-mail: andrzej@szerszen.org.

Archeologów Jutra) has submitted a project to the National Heritage Board of Poland (Polish: *Narodowy Instytut Dziedzictwa*) and at the beginning of the year received funding within the program *Protection of Archaeological Heritage – Edition 2019* (Polish: *Ochrona zabytków archeologicznych 2019*). The project *Vistula Underwater Heritage of Warsaw and the Surrounding Area. Recognition of Underwater Archaeological Sites as a Part of AZP Research*[2] provides for the recognition and inventory of archaeological sites located in the waters of the Vistula River from the Żerański Canal in Warsaw (520 km of the river) to Jabłonna Commune (533 km of the river; Legionowo County, Masovian Voivodeship) with a total area of about 4.8 km² (**Fig. 1**).

The first regular research in Warsaw section of the Vistula waters was carried in 2011–2015, and its aim was to find marble ornaments and other decorations of Warsaw palaces, transported on ships during the Swedish Deluge (Kowalski and Wagner 2016; Kowalski 2015a; Kowalski 2015c). These pioneering studies brought a huge amount of architectural, military, and boatbuilding findings, which in recent years have become the subject of scientific studies (Kowalski 2015b, Kowalski 2014) and popular science publications (Kowalski 2013; Jamkowski and Kowalski 2018).

In 2012, due to the low water level (Kowalski *et al.* 2013: 24), at the point of Bednarska Street in Warsaw, archaeological inventory works were realized around the piles protruding above the river level – relics of old bridges. In 2015 hydrological conditions allowed the continuation of work by the team of the Association of Archaeologists of Tomorrow, experienced in underwater research, and their result was an inventory of 180 pales. The following year non-invasive archaeological work was implemented using high frequency side sonar by the same team. The research covered the section of the river between the Gdański Bridge and Karowa Street and in the vicinity of Wilanów (district of Warsaw), where a single pile was noticed giving the basis for the inference. A total of about 53 ha of the riverbed in the centre of Warsaw and about 5 ha in Wilanów (Brzóska and Prejs 2018: 188–189) were investigated. As a result, 166 new piles were discovered between the Gdański Bridge and the Świętokrzyski Bridge. There were 59 of them at the point of Bednarska and Karowa Streets, and 11 were located directly by the Gdański Bridge. The most interesting discovery was 96 pales located at Mostowa/Boleść Street, which are probably a part of the oldest bridge in Warsaw built in 1573–1603 (Brzóska and Prejs 2018: 184–185, Chwaścicki 1997: 14).

[2] Application number 2208/19 financed from the funds of the Minister of Culture and National Heritage.

Barge wreck (W10), 12–metres-long and 2.5-metres-wide, lying on the left bank of the river at the point of the Old Town, is another important discovery worth mentioning (Sadurski 2018: 176–178). Inventory and underwater research works from 2015–2016 were financed by the Bureau of the Culture of the City of Warsaw (Polish: *Biuro Stołecznego Konserwatora Zabytków*)[3]. In 2017 funding from the same source was given to another project, *Archaeological Research of the Warsaw Vistula River Shipwrecks* (Polish: *Archeologiczne badania wraków statków wiślanych*), which is a continuation of work from previous years, aimed at identifying previously discovered wrecks. The effect was the documentation of the three wrecks marked as W1, W2, and W10. For units marked as W1 and W2, dated to 1877 and 1521 respectively, it was possible using dendrochronological analysis of wood samples obtained from both wrecks (Sadurski 2018: 173, 175), while the wreck W10 occurred to be an example of a 20th-century steel barge (Sadurski 2018: 176).

About the Project

The fieldwork prospection method with the use of high frequency (1200 khz) side sonar will be implemented in the planned research (**Fig. 2**). It is necessary to emphasize the constant development of sonar devices, which translates into better imaging of the bottom than it was a few years ago. The progress in the field of technology allows seeing more details of objects and facilitates their interpretation. An equally high frequency of work was previously available only in towed sonars, however, in the hereby project a transom transducer will be used, that gives the possibility of investigating very shallow waters, and is limited only by the immersion of the research boat and engine. An additional difficulty is the variable level of the river causing the necessity to adjust floating to its rhythm, lower and higher water levels. There is a need for continuous monitoring of the riverbed due to erosion and accumulation of bottom sediments, which contribute to covering or revealing objects at the riverbed.

The chosen area will be divided into strips, so that sonar observation ranges overlap each other, achieving the maximum degree of site inspection. The entire process will be registered directly with GPS/GLONASS with the recording of paths. Recorded GPS tracks as well

[3] Initially as part of the project *Interdisciplinary Studies of the Vistula River* led by Hubert Kowalski, Ph.D.

as sonar images will be mutually correlated with each other and placed on plans in the GIS system. Next, a detailed analysis and interpretation of the sonographic map of the bottom will be elaborated in terms of reflective horizons of anthropogenic character. In selected places, which will be recognized as traces connected with human activity, diving will be carried. Their main goal will be to confirm the anomalies observed on the sonar image, determine the type of object and its preliminary dating. On this basis, a list of archaeological sites will be registered and AZP reporting sheets will be prepared. The planned research area runs through four areas of AZP programme: 55–65, 55–66, 53–65, 53–64, for which underwater non-invasive prospection will be a valuable supplement. The team of archaeologists and divers involved in the project has a vast experience necessary to implement the project (*cf.* Kontny, Brzóska, Prejs 2018; Kontny, Brzóska, Bucholc *et al.* 2018). The results of the works are to be included in the further studies.

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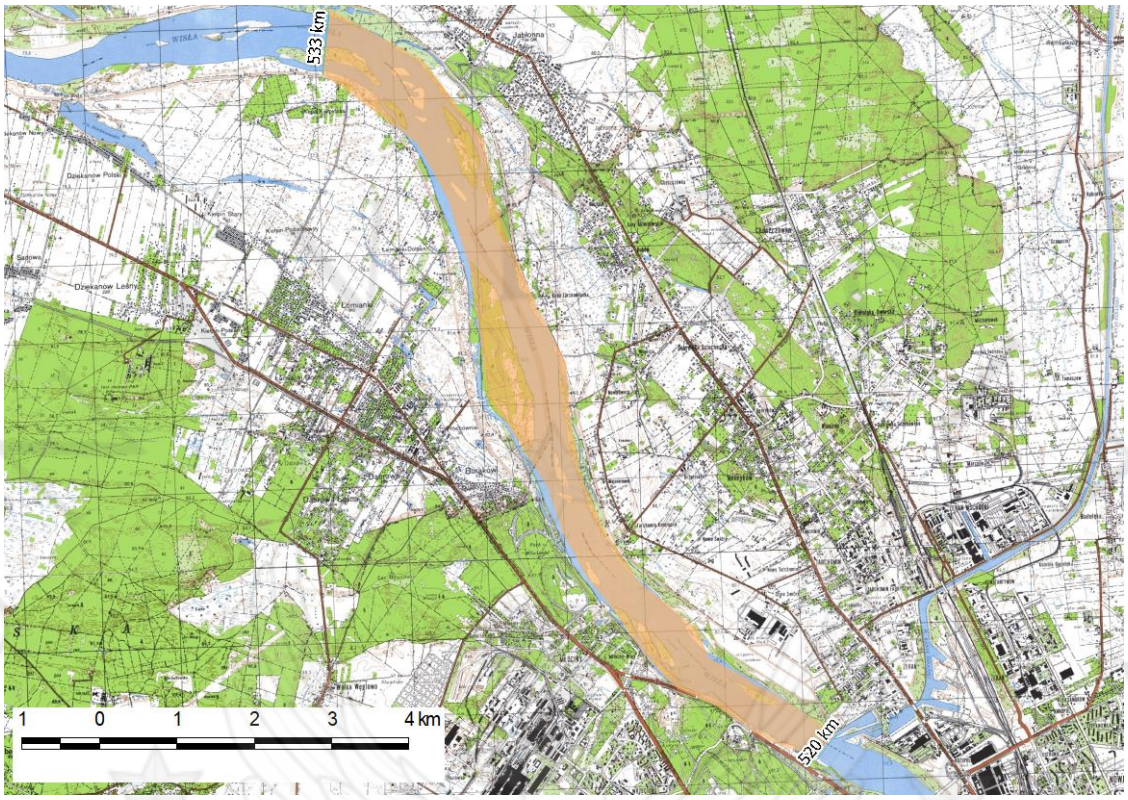

Fig. 1 – A map on which the research area of the Vistula River is marked with colour (elaborated by: P. Prejs)

Fig. 2 – Members of the project team (photo by: R. Małys)

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