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## **Preserving a layered history of the Western Wadden Sea : managing an underwater cultural heritage resource**

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# 1. General introduction



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Much of what has been produced and used by humanity has been lost, thrown away or left behind under water. Sometimes this has happened on purpose, such as the dumping of waste, sometimes by accident, such as the loss of ships. The Netherlands is blessed with a tremendous amount of maritime and underwater cultural heritage, hidden in the North Sea, the Dutch rivers and lakes, in reclaimed land, in former river branches, in estuaries and tidal inlets that have become silted up and, last but not least, in the large tidal basins of the Wadden Sea and the Southern Delta region. However, this resource is primarily invisible to most of us. With a largely 'land-based' archaeological community, there is a bias towards looking at Dutch history from the land towards the water and not the other way around. The – often muddy – waters of the Netherlands, the difficulty of executing archaeological research under water and the tight budgets for cultural heritage management in general have resulted in this enormously rich and often well-preserved resource being largely neglected by archaeologists, historians and cultural heritage managers.

However, over the last three decades, and in cooperation with a more substantial international community of professional and avocational maritime and underwater archaeologists, our insights into this rich underwater resource and the opportunities to research and protect it have improved considerably. Building upon this experience with the underwater resources, I have seen and experienced many of the changes in underwater archaeology and the management of underwater cultural heritage. The changes have been both for the better and the worse, forced by developments inside and outside the profession, from the local to the international scale. In the meantime, many new sites have been discovered and dealt with. This thesis presents an analysis and evaluation of what has happened over the years, what we have gained and what we have lost. New ways to deal with underwater cultural heritage will be proposed. The thesis, therefore, focuses on this one primary question:

## How can we manage the underwater cultural resource?

I hope this research will be useful for maritime and underwater cultural heritage managers, archaeologists and policymakers as a background study for their own use and to stimulate discussions about the future value (and non-value) of the management of underwater cultural resources.



Fig. 1.1 A historic replica of a three-masted ship on the Texel Roads. Photo: Paul Voorthuis, Highzone Fotografie.



Fig. 1.2 The Scheurrak SO1 excavation 1989–1997. Photo RCE.

### 1.1 Introducing underwater archaeology and underwater cultural heritage management in the Netherlands<sup>2</sup>

Although still a relatively young discipline, underwater archaeology and cultural heritage management has come a long way since its cautious beginnings almost 50 years ago. This development can be divided into roughly four stages:

1970s: a nascent interest in diving on shipwrecks and a growing interest to learn more from them, initiated by adventurers and volunteers

1980s: professional interest (archaeology and history) and growing interest from the field of heritage management

1990s–2007: formative phase, with specialized professionals being educated and trained by the Dutch government. Underwater archaeology and management is systematically integrated into national heritage management.

2007–present: decentralization of responsibility in heritage management.

Starting tentatively with professional underwater archaeology and underwater cultural heritage management in the early 1980s, since the mid-1980s – when the work was finally taken up more seriously – until now, the number of underwater sites that have been annually reported in the Netherlands is about 50 to 100. Quite a few are of specific archaeological importance and still of high integrity. This means that large parts of the ships, as well as cargo, inventory and personal belongings, are often well preserved.

As part of this rich resource had become known through the intensification of recreational diving in the late 1970s and early 1980s,<sup>3</sup> it was decided that it would be sensible to focus on

rescue research of newly discovered sites. In addition to negotiating mitigatory research associated with large-scale public works,<sup>4</sup> attention focused on the more dynamic tidal basins and especially the Wadden Sea. There was no way everything could be done, not even in these tidal basins, and so the work concentrated on a few marvellous excavations, such as the sixteenth-century grain trader called the *Scheurrak SO1* (Fig 1.2) and a large seventeenth-century trader, the *Aanloop Molengat*, with a cargo of half-products.<sup>5</sup> This focused approach had its advantages. With limited energy and investment on the government side,<sup>6</sup> but the help of many people, mostly recreational divers and colleagues from abroad, good results were produced.

During the early period of professional underwater archaeology in the Netherlands, which roughly covered the period from the late 1980s to the early 1990s, the two above-mentioned sites were also used to develop strategies and techniques for dealing with the difficult natural conditions predominating in the area, such as strong currents and bad visibility. By excavating the sites, a 'window' on the potential of underwater heritage was gradually opened for a wider public.

The decision to focus on these excavations was made in the context of earlier developments. The first semi-archaeological research in the Netherlands on historical shipwrecks was undertaken in the 1970s, but the government only seriously took up its responsibilities for underwater cultural heritage in the mid-1980s.<sup>7</sup> The fact that underwater archaeology received a crucial stimulus at that time was due to several reasons. One of these was the fact that in 1986, Christies auction house had sold gold and porcelain from the wreck of the VOC ship the *Geldermalsen* for approximately 40 million guilders.<sup>8</sup> The

<sup>2</sup> Parts of this chapter were published by Manders & Maarleveld (2006). All the information has been updated and the text has been rewritten considerably

<sup>3</sup> See the first three annual reports by Maarleveld (1982, 1983 and 1984). These reports show the dependence of the government on the recreational diving community. Up until the last two annual reports of the NISA (Morel & Oosting 1994, 1995), the research results from the professional and the amateur underwater archaeological community were published together. This tradition has finally started again. For 2005, the ROB is preparing a new publication in collaboration with the LWAOW.

<sup>4</sup> The Slufter project (Adams, Van Holk, Maarleveld 1990).

<sup>5</sup> *Aanloop Molengat* (1987–1992 and 2000). See for an overview, Maarleveld 1993(1) and Maarleveld & Overmeer (2012) and *Scheurrak SO1* (1989–1997), see for an overview Manders 2003 (2).

<sup>6</sup> The Afdeling Archeologie Onderwater or department for underwater archaeology (AAO/WVC) existed until the mid-1990s, after which, this executive department for underwater archaeology became part of the NISA (Netherlands Institute for Ship and Underwater Archaeology, ROB/NISA).

<sup>7</sup> Normann 1987.

<sup>8</sup> Jörg 1986.

*Geldermalsen* sank on her homeward voyage in 1752 with over 150,000 pieces of porcelain on board. It was discovered near Indonesia in 1985 by Captain M. Hatcher. Although the salvaging of the objects was not seen as the ultimate example, or 'best practice', of how to conduct archaeological research under water, it appealed to the imagination of the wider public and therefore made underwater archaeology a subject of general discussion. Never before had maritime cultural heritage shown its richness in such a public way and, even 'better', everybody was able to buy a piece of it! The *Geldermalsen* and other salvage projects were hot issues for journalists.<sup>9</sup> It now became important for the archaeological community to show that 'sound' archaeological research under water could help us to make an even better reconstruction of the past, if it was executed in 'the right way'.<sup>10</sup>

Although the tensions between commercial salvagers and maritime archaeologists was not only a Dutch issue, these salvage operations can be seen as a driving force for change in the Netherlands. In response to the sales of the mid-1980s, a Commission of the Royal Netherlands Academy of Arts and Sciences<sup>11</sup> was established which had the task of investigating the current situation in underwater cultural heritage management in the Netherlands. The Commission concluded that 'the Dutch government failed in its policy because of its lack of interest in cultural heritage on the seabed'.<sup>12</sup> The Commission also stated that 'there is a serious lack of tradition in the country concerning maritime archaeological research'.<sup>13</sup> The overall conclusion of the Commission was that something had to be done immediately to safeguard this rich resource.<sup>14</sup>

In the same period, and not completely by chance, the Dutch national Heritage act was being revised. In 1985, it was determined that the Dutch Monuments Law also applied to its underwater cultural heritage. At the end of that year, the Dutch Monuments Law of 1969 was updated, although it was only to be implemented some years later in 1988.

It was felt that the updated law not only provided an opportunity to change the rules but also to change attitudes.<sup>15</sup> On 15 March 1985, a symposium entitled 'Verantwoord onder water' was

organized by the KNOB in Den Helder, at the southern-most tip of the Wadden Sea. It was one of the first times that different views on how to conduct research on shipwrecks were presented in order to initiate a true debate.<sup>16</sup> One year later, on 17 September 1986, a second symposium was organized by the Nederlandse Museumvereniging, entitled 'Plundering, of verrijking van de scheepvaartgeschiedenis' (Plunder, or enrichment of the maritime past). This conference aimed to gather and discuss various opinions and views on the salvaging of the *Geldermalsen*. Public opinion was mobilized through the media to appeal for the protection of underwater maritime heritage.<sup>17</sup> It is interesting to see that, according to public opinion at the time, the best way to safeguard underwater cultural heritage was to excavate it.<sup>18</sup> The pressure from all sides led to the establishment of a small archaeological diving unit and the political and public support to start the above-mentioned long-term excavations on the *Aanloop Molengat* and *Scheurrak* SO1 sites.<sup>19</sup> With these excavations, the subsequent governmental underwater archaeological agencies have proved the richness of our underwater cultural heritage. These underwater archaeological excavations also proved that this was not just something for the Mediterranean, but that it could even be done in the dark and murky waters of the Netherlands.

The focus on excavation was adopted, in an attempt to avoid the traps of protection for the sake of protection.<sup>20</sup> A focused approach was needed in order to develop adequate underwater archaeology practices under the prevailing conditions, without being distracted by the continuous flow of sites being discovered. Therefore, at that time, it was consciously decided not to follow exactly the same path as terrestrial archaeology, where, since the mid-1970s, the notion of preserving archaeological resources for future use was growing, questioning the impact of any disturbance.<sup>21</sup>

In the second half of the 1990s, it became clear that the approach to underwater cultural heritage needed to change. Through excavation, knowledge had improved and ambitions had changed. Underwater heritage management was becoming an accepted public responsibility and, more than before, there was a

<sup>9</sup> See *Volkskrant*, 23 July 1985.

<sup>10</sup> Regteren Altena 1987, 13: 'The Netherlands can contribute to the effective protection of historical shipwrecks by developing a vision on underwater archaeological policy that is focused on "excellent research".'

<sup>11</sup> The 'Commissie Normen Onderzoek Scheepswrakken' was installed in 1985 by the KNAW (Koninklijke Nederlandse Akademie van Wetenschappen: Royal Netherlands Academy of Arts and Sciences) and had two members, Prof. J.R. Bruijn and Prof. H.H. van Regteren Altena.

<sup>12</sup> Rapport van de commissie Normen Onderzoek Scheepswrakken KNAW 1985, 26.

<sup>13</sup> KNAW 1985, 16.

<sup>14</sup> See KNAW 1985.

<sup>15</sup> The symposium 'Verantwoord onder water' (KNOB 1986). The symposium

'Plundering, of verrijking van de scheepvaartgeschiedenis' (Brand et al. 1987).

<sup>16</sup> KNOB 1986.

<sup>17</sup> Meijer 1986, Hansen 1986(1), Hansen 1986(2), Hansen 1986(3), Ridderikhof 1986.

<sup>18</sup> Eelman 1986, Hansen 1986(4) and KNOB 1986, 53.

<sup>19</sup> Jessorun 1991, 19–21.

<sup>20</sup> Maarleveld, 1993 (2). The protection of a site might be solely done for pragmatic reasons to postpone making decisions as to what to do with it in the future. However, protecting a site means that responsibility is taken for its future welfare. This means that protective measures are meaningless if they are not accompanied by a management plan. The time frame should also be part of the management plan.

<sup>21</sup> Lipe 1974, Green 1984.

need for an overall assessment of resources. Significance assessments were undertaken and, through various European projects, cooperation between several countries led to research on the deterioration and in-situ preservation and protection of shipwreck sites.<sup>22</sup> With an increasing focus on and stability in budgets (albeit temporary), staff, credibility and support in the following decade, it was possible to investigate what our rich underwater maritime heritage had to offer and to open this archive for investigation and enjoyment.<sup>23</sup> The sites were and still are today primarily being inventoried, assessed and monitored; as well as valued and compared. In doing so, we are grasping the extent of the resources, we know the existence of.

In summary, there has been a shift from focused archaeological excavations to managing the resource.<sup>24</sup> For underwater archaeology, this means more emphasis on making an inventory of all the sites that have been discovered and producing some sort of overview of the potential of Dutch underwater cultural heritage.

Until recently, our knowledge of the underwater resource was completely based on incidence: a wreck was discovered and something had to be done with it. This incident-driven approach has been viable and accepted for a long time, as in fact it has been on land as well. In addressing the new ambitions of gaining better knowledge and an overview, however, it was essential to ensure that management was not incident-dependent. Starting from scratch, new techniques needed to be developed to assess the volume, quantity and quality of maritime heritage we were potentially dealing with. With the information that the national cultural heritage agency and others have since collected, it has become possible to roughly estimate what might potentially still be found.<sup>25</sup> To obtain an even better idea about what is left in the seabed, this information was translated into predictive models and combined with information from dry areas. In this way, the

importance of specific areas and sediment layers that we had no solid information on has been assessed. Based on such predictions, a very general management tool was developed: the indicative map of archaeological values (IKAW). Since then, even more accurate and detailed methods have been established.<sup>26</sup> In the first half of the 1990s, management thus shifted from a short-term (excavation) to a long-term approach (inventory, monitoring and safeguarding; building up and maintaining an archive under water).

The Dutch Government, through its cultural heritage agency, has also positioned itself differently since the mid-1980s. This has slowly but steadily created opportunities for others (besides the national government) to do research, gain overviews and further support the management of archaeological heritage.<sup>27</sup> Until 2006, the national government was the only professional actor in underwater maritime heritage management. In that year, the first ever development-led excavation was carried out by a commercial party.<sup>28</sup> In early 2017, there were five commercial parties with an excavation licence for archaeological work under water.<sup>29</sup>

Building an inventory of what we know means that we can selectively protect sites for the future, while in theory it may also be possible to choose exactly the right site to excavate in order to fill a gap in our knowledge or to contribute to solving a research question set out in a research agenda.<sup>30</sup> By doing so, it is no longer necessary for chance finds to dictate the research and a problem-oriented approach can be taken. Sites with a high research value are being well protected and managed to safeguard the resource for future research. Research may therefore shift from excavations led by chance and intuition, to question-based research led by rules, guidelines and scientific programmes, or what should be 'best practice' in archaeology. I

<sup>22</sup> These were the MoSS, BACPOLES, MACHU, WreckProtect and SASMAP projects. See further in this thesis for more information about these European projects.

<sup>23</sup> E.g. Daalder et al. 1998.

<sup>24</sup> ROB 1995, ROB n.y.(1), ROB n.y.(2)

<sup>25</sup> Maarleveld 1995, 1998, Deeben et al. 2005.

<sup>26</sup> Deeben et al. 2002, also Lauwerier & Lotte 2002. IKAW (Indicatieve Kaart Archeologische Waarden) was designed for both land and underwater terrain. For underwater terrain, it can only roughly tell us something about the possibility of finding sites in certain areas. It lacks information about sediment build up, erosion and other natural and human threats, but also information about current and past land/water use. This makes it a good basis for the prediction of prehistoric sites under water, but not particularly for shipwrecks. Although superficial, the overview created has been of assistance in convincing other stakeholders to care for our maritime heritage. The static overview, which does not represent the dynamics of the Dutch seabeds, has led to the development of a new system: the Historical Geomorphological Map set. See also Chapter 2.

<sup>27</sup> Archaeological Management Research.

<sup>28</sup> ADC ArcheoProjecten.

<sup>29</sup> ADC, RAAP and Archol have a licence for both underwater and land research, while ADT and Periplus Archeomare only have a licence for underwater excavations. The City of Amsterdam (within its municipal borders) and the RCE also have a licence for underwater excavation. On 1 June 2015, licences for archaeological excavation were held by 4 universities, 41 companies, 21 municipalities and 1 for the national government (RCE) (<http://erfgoedmonitor.nl/indicatoren/opgravingsvergunningen-aantal-uitvoerder>, accessed 7-10-2015). On 30 October 2016, this had not changed, except for the growth in the number of municipalities with an excavation licence from 21 to 25 (<http://erfgoedmonitor.nl/indicatoren/opgravingsvergunningen-aantal-uitvoerder>, accessed 29-01-2017). The system of archaeological excavation licences will disappear with the implementation of the new Heritage act in 2017 and a system of personal certification is being put in place and will be active from July 2017 onwards (<http://cultureelerfgoed.nl/dossiers/erfgoedwet/archeologie-en-de-erfgoedwet>, accessed 29-01-2016).

<sup>30</sup> A new national research agenda has been drafted, which includes maritime and underwater cultural heritage: [http://cultureelerfgoed.nl/sites/default/files/downloads/dossiers/g02-026\\_rapport\\_noaa\\_2\\_0\\_def.pdf](http://cultureelerfgoed.nl/sites/default/files/downloads/dossiers/g02-026_rapport_noaa_2_0_def.pdf) (accessed 29-01-2017). See also <https://cultureelerfgoed.nl/nieuws/nieuwe-nationale-onderzoeksagenda-archeologie-online>, accessed 29-01-2017).



deliberately say 'may', because at the moment (2017) archaeology and archaeological heritage management in the Netherlands are still – and probably will be for a long time – dictated by a prevailing in-situ preservation policy strongly linked to the 'disturber pays principle,' as laid out in the Treaty of Valletta (1992). This was put in place to protect archaeological sites from being excavated without proper preparation, plans, resources or an overall rationale for why the excavation is necessary. Although excavations do occur, a proper discussion of the functionality of excavations in general remains limited and driven more by the practical circumstances (mitigating a 'problem' for the client) than by a well-argued scientific or societal reason (the need to learn about the past).<sup>31</sup>

Changes in policies, laws and regulations thus change the approach to how work is executed. Another example of this is the change in the mid-1990s in dealing with the participation of other stakeholders in archaeological dive projects. Until 1995, the national government (at that time the ROB) was able to dive and excavate with few legal restrictions. However, in December 1994, a new law 'Besluit Arbeid Onder Overdruk' (The Law on Hyperbaric Labour, working under excess pressure) was implemented. This law stipulates that anyone who works under water must possess a specific professional diving licence.<sup>32</sup> Archaeology students and colleagues in other countries, however, generally make do with other qualifications, such as sports diving certificates. Thus, it has become very difficult for them to participate in underwater research with the Cultural Heritage Agency under this new law. Fortunately, soon after the introduction of the dive law, an exception was made to allow, in specific circumstances, students to participate in the work as long as they had 'sufficient' experience in diving. Unfortunately, the medical check for these students has to be done on a professional level which is another financial obstacle.<sup>33</sup> This law also remains an obstacle for joint diving between avocationalists and professionals, which has a strong effect on the participation of other stakeholders, including local communities, in underwater cultural heritage management.<sup>34</sup>

For a long time, well into the 1990s, underwater archaeologists did not have a specific academic archaeological background but came from a diving community or other scientific disciplines such

as maritime history and oceanography.<sup>35</sup> It is only more recently that university-trained underwater archaeologists have begun to do the work. Contacts and connections with various stakeholders is therefore traditionally very strong in underwater cultural heritage management.

Since the implementation of the European Valletta Convention (Treaty of Valletta, 1992) in Dutch law in 2007, cultural heritage management has been decentralized and in many cases has become the direct responsibility of the municipalities, rather than the national government.<sup>36</sup> What many of them may not have realized is that this responsibility also stretches to the water, including rivers, lakes and seabeds. The desire to also manage this heritage has slowly awoken and led to a degree of critical evaluation of the system as implemented in the Monument Law.<sup>37</sup> The question is whether these municipalities are up to their tasks.

It was due to this decentralization and the changing role of the national government in underwater cultural heritage management that the need to develop tools for management and to build capacity for the execution of it – once again – by different stakeholder groups became urgent. As a direct consequence of this, the Maritime Programme was established in 2012.<sup>38</sup> Its establishment was decided on at ministry level after the evaluation of the implementation of the Valletta Treaty in the Dutch Monuments Law. This evaluation made the lack of integration of maritime cultural heritage management into overall cultural heritage management very clear.<sup>39</sup> The primary task of this programme was to have a basis for maritime and underwater cultural heritage management in place by mid-2016.<sup>40</sup> The integration of underwater and maritime archaeology, including maritime and underwater cultural heritage management within the management structures of the Cultural Heritage Agency of the Netherlands (RCE), was largely established in March 2016.<sup>41</sup> Tools for other actors have been developed and made accessible.<sup>42</sup>

Although stepping away from its former responsibilities in many cases, there are some exceptions in which the national government remains the lead management organization for underwater cultural heritage: the North Sea is still managed nationally and the government has a direct responsibility in other national waters

<sup>31</sup> See also Fontijn 2017.

<sup>32</sup> HSE 1 and the Dutch equivalents NDC duikarbeid A and B.

<sup>33</sup> See also Vroom 2017.

<sup>34</sup> Efforts have been made to also create exceptions within the dive law for archaeological dive training by professionals for avocationalists, and for field cooperation. To date (January 2017), this has unfortunately not led to any changes in the law.

<sup>35</sup> Alexander McKee, discoverer of the Mary Rose near Portsmouth was, for example, an historian (McKee 1982).

<sup>36</sup> Wet op de Archeologische Monumentenzorg (WAMZ) 2007. <http://wetten.>

[overheid.nl/BWBR0021162/2008-01-01.](http://overheid.nl/BWBR0021162/2008-01-01.)

<sup>37</sup> Idem.

<sup>38</sup> <http://cultureelerfgoed.nl/dossiers/maritieme-archeologie/maritiem-programma> (accessed 29-01-2017).

<sup>39</sup> Tweede Kamer, vergaderjaar 2011–2012, 33 053, no. 3

<sup>40</sup> See [www.maritiem-erfgoed.nl](http://www.maritiem-erfgoed.nl) (accessed 19-1-2017).

<sup>41</sup> This was according to the plans made in 2012.

<sup>42</sup> [www.maritiem-erfgoed.nl](http://www.maritiem-erfgoed.nl) (accessed 19-1-2017).

<sup>43</sup> See e.g. Rijkswaterstaat 2012, 99 & 150.





Fig. 1.3 This is what people usually see when looking at the Wadden Sea: the water surface and what lies above it, not below. Photo M. Manders.

and nationally initiated projects.<sup>43</sup> In all other cases, there is a strong need to cooperate with new competent authorities and other stakeholders in underwater archaeology research and cultural heritage management. The knowledge gathered over the years should be transferred to those who now have (or should have) the responsibility for the resource.

## 1.2 Research problem

As we have seen, since the early 1980s, we have learned a lot about underwater cultural heritage in the Netherlands, both in terms of the resource itself and the relevant research issues and heritage management. It is abundant, often rich and extremely well preserved. It is also constantly threatened and is the responsibility of several governmental agencies on the regional and national levels. Due to new laws and regulations, this responsibility has increasingly become the task of local government – the municipalities – who often need more knowledge and facilities to be prepared for this new role. Diving regulations have become more strict and cooperation between professionals and amateurs has become more difficult as a result. At the same time, underwater cultural heritage management has shifted from an incident-driven task to at least exhibiting the willingness to undertake long-term management. The problem, however, is that the amount and quality of archaeological remains and the immediate danger they are in, urge us to act quickly to save valuable resources at sites under threat. At the same time, there is also urgency to act in a responsible way and to determine which sites are still in real need of investigation and preservation. The tension between the two issues is evident. However, with a more active and intense use of the water by more stakeholders and the responsibility for cultural heritage placed in lower level government bodies, it has become more urgent to start thinking about the way we can establish longer term and integral management of the resources of our sea, river and lakebeds.

Underwater sites are often situated in a hostile environment and are thus invisible to most people (Fig 1.3). This alone creates many management issues that specifically relate to underwater

resources. As a result, they are often not taken into account prior to or even during development activities in an area. Thus, a necessity has arisen to develop effective ways to make underwater cultural heritage visible to non-specialists, such as land archaeologists, experienced divers, planners and other stakeholders who need to be involved in the management. By making this resource visible, it becomes more realistic that a joint effort can be made to take care of it. As the development of ways to mitigate against threats to the underwater cultural heritage resource has to date been limited in its scope and evaluation, the time is ripe to achieve more.

Gaining a good understanding of what resources remain and what can still be found is essential for land-use planning, construction, infrastructure planning and the sustainable exploitation of maritime resources, tourism and recreation (Fig 1.4 presents an overview of the sites discovered on and in Dutch seabeds). Cultural heritage, although a blessing for many culturally minded people,<sup>44</sup> is, however, often a curse for others, such as project developers and spatial planners. The high costs and delays associated with archaeological projects have to be mitigated to meet the interests of the latter. The sooner the 'problem' is known, the better the solution can be sought. Realizing that cultural heritage values are not always perceived positively – especially when high levels of investment are involved – has been a real eye-opener to many archaeologists who made the step or career move from primarily being an archaeologist to working in the societal and spatial setting of cultural heritage management or policy planning. Even within governmental agencies, the differences in stakeholder attitudes towards underwater cultural heritage within infrastructural projects is a well-known and recognized issue. This means that the rationale for protecting underwater cultural heritage has to be evaluated and communicated clearly and repeatedly. Out of sight too often seems to mean also out of mind.

As we have seen in the preceding section, underwater archaeology has painstakingly and slowly developed from an adventurer's

<sup>44</sup> Or others with a profit to make from cultural heritage.

profession – which focused primarily on the retrieval of objects – to a systematic and scientifically justifiable archaeological investigation of shipwrecks focused on retrieving data through excavation. Much of the work executed in underwater archaeology and cultural heritage management has been a direct response to incidental discoveries that resulted in ad-hoc solutions, restricted by the financial means and capacity available. Underwater archaeology is expensive and requires specialists to execute it. Even now, when an underwater site is discovered, a discussion amongst terrestrially orientated archaeologists arises concerning whether to treat it differently than we would do a terrestrial site. The recovery of all the beautiful finds then often prevails over fact-finding through proper underwater archaeological excavation.<sup>45</sup> In the meantime, it has proven to be necessary to develop specialized methodologies for doing archaeological research in dark, muddy and often inhospitable contexts. In the process, underwater archaeology has been looking for branch-specific solutions, proving its right to exist alongside mainstream terrestrial archaeology.

With the signing and ratification of the Treaty of Valletta (1992), greater emphasis has been placed on the management of archaeological resources in general, including underwater resources. By placing the responsibility partly outside the archaeological community, on local governments and those who intend to disturb the site, the urgency to do something with the resource has increased. The 'disturber-pays-principle', which is one of the basic principles of the Treaty of Valletta, ensures the attention of these stakeholder groups. In-situ preservation, as the first option to consider, is an important rule in the Treaty and other subsequent conventions and guidelines for underwater cultural heritage management such as the ICOMOS charter for the protection and management of underwater cultural heritage (Sofia, 1996) and the UNESCO Convention on the Protection of the Underwater Cultural Heritage (Paris, 2001). This has induced a shift in activities towards cultural heritage management, with in-situ management as the primary focal point. It is questionable, however, whether in-situ preservation of underwater sites is always the most logical option, and for underwater cultural resource remains especially, this should be carefully examined.

While the changes in rules and regulations first led to the exclusion of specific actors and stakeholders, for example due to stricter diving regulations, in recent years there has been more inclusion, due to more general regulations that support participation. Stakeholders such as sports divers and source communities need to be included in underwater heritage management. The

issue is how to realize this. More stakeholders also means an acceptance that cultural heritage has different values. A site or an object can be perceived and interpreted differently by different groups within society, depending on cultural and social background and political context. It will be interesting to see how this growing diversity has implications for how we will or should use this heritage now and in the future. Participation in the decision-making process and activities related to cultural heritage management by different individuals and groups will only increase in the coming years. Thus, it will also be interesting to see what the consequences are for archaeologists and cultural heritage managers, who need to prepare themselves and start thinking about what role they should and are willing to play.

The effects of infrastructure projects and other human interventions on the seabed are substantial. It is not only the short-term effects that threaten archaeological sites but also long-term deterioration and erosion. However, this is still rarely taken into account when permits are granted for infrastructure projects. Only after decades do we see the long-term and delayed effects.<sup>46</sup> These can be severe, but responsibility for the consequences is always a complicated issue, especially after many years. This should be regarded as one of the major downsides of the implementation of the Valletta Convention in the Netherlands and many other countries in Europe (see for more on these threats, chapter 3).

The fact that, today, municipalities are being asked to take care of their own heritage also poses multiple difficulties. Just to name a few: firstly, underwater cultural heritage is 'invisible', so who wants to protect it?; secondly, municipalities have never felt responsible for underwater cultural heritage and therefore have no tradition to fall back on;<sup>47</sup> and thirdly, the dynamics of heritage management can be completely different on the local level than on the national level. Local communities and stakeholder groups are socially and politically close to the decision-makers and, therefore, may have more influence, convincing them of their interests. This may be contradictory to the aims, intentions and ambitions of national authorities such as the RCE, or the wider professional archaeological community. The primary aim of local stakeholders might be to make underwater cultural heritage more visible and accessible, which may be done by excavating the remains rather than through in-situ preservation. The latter can be seen by these local communities as a way of avoiding responsibility.<sup>48</sup> Also, the view about what is important to 'keep' (ex or in situ) may well be different from a local perspective, in comparison to the view of a national institute that is concerned about the 'stepping stones' of Dutch maritime history.<sup>49</sup>

<sup>45</sup> See also <https://muablog.wordpress.com/2010/05/17/the-advisory-council-on-underwater-archaeology-by-matthew-a-russell/> (accessed 23-1-2017).

<sup>46</sup> One example of this is the Afsluitdijk, which was built in 1932 to close off the Zuiderzee from the Wadden Sea. Its long-term effects are still visible in the Wadden Sea. See also Elias et al. 2012.

<sup>47</sup> See, for example, also [http://www.oudhoorn.nl/archivering/kroniek/2014/kroniek\\_2014\\_februari.php](http://www.oudhoorn.nl/archivering/kroniek/2014/kroniek_2014_februari.php) (accessed 29-01-2017).

<sup>48</sup> See, for this expression, also Manders et al. 2009 (1), 179.

<sup>49</sup> Manders 2015(1).

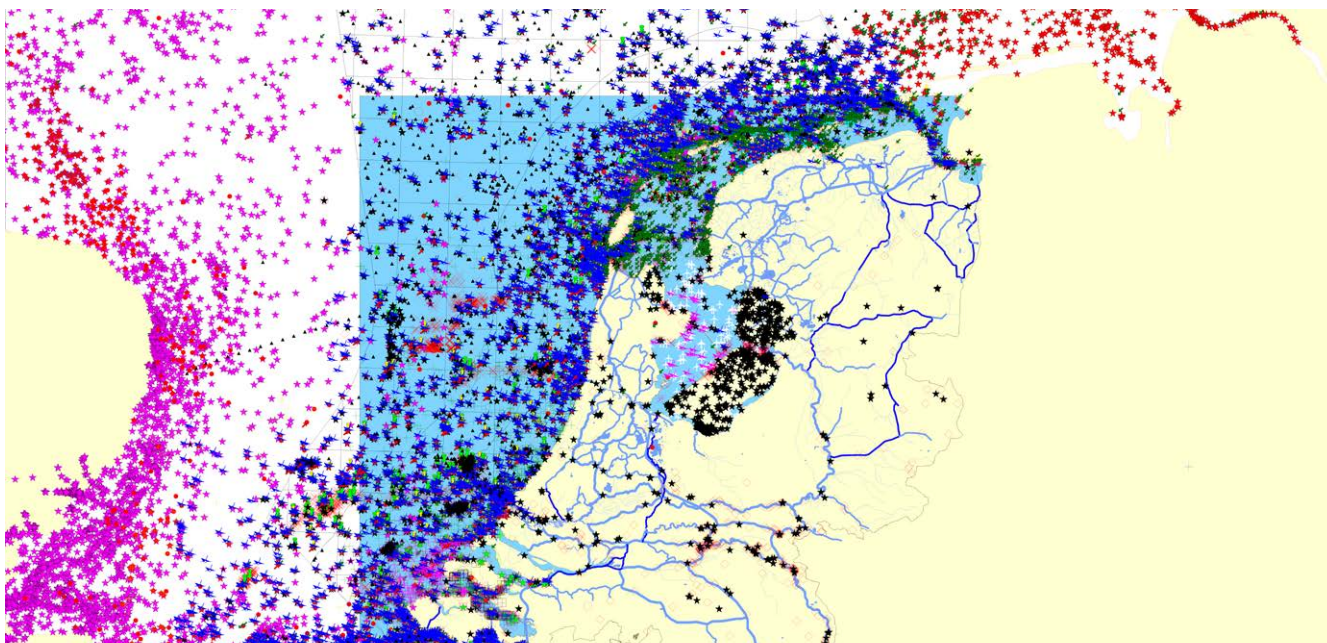


Fig. 1.4 More than 60,000 locations on Dutch seabeds. This is a view of all the known locations recorded in the Archis 2, Hydrographic Office, RWS and amateur archaeologist databases combined. Figure: courtesy RCE.

All these discrepancies in perspectives may lead to different views on what is regarded as valuable and important, and of what needs to be maintained or researched and what should not. One could argue, of course, that such a dialogue or even controversy could, in the end, be advantageous for cultural heritage management. On a management level, diverse interests, on various levels, of different stakeholder groups, may well strengthen common management goals. Fishermen may want to preserve shipwrecks because they are important due to the amount of fish that inhabit them. For divers, enjoyment is often the primary reason to preserve wrecks. A holistic approach that looks at the significance of different sites for different stakeholders is therefore the only proper way to ensure the long-term preservation of underwater cultural heritage.

In archaeological heritage management, in-situ preservation is now considered to be the first option. This is also true for underwater cultural heritage management. This has been made explicit in a few prominent laws and policy papers.<sup>50</sup> But why is this the case? Why has it become such an important part of heritage management in general? Is it because it is a panacea – a wonder pill – for cultural heritage management? Does it provide solutions to most of the problems that arise? And is it the most convenient for most of the stakeholders involved?

These became urgent questions for the author after becoming actively involved in the negotiations of the UNESCO Convention on the Protection of the Underwater Cultural Heritage (Paris, 2001). It has triggered thinking on how we should preserve our rich cultural heritage in an inclusive way: not by considering the sites one at a time, but taking this heritage as an integral and meaningful whole that needs to be responsibly, systematically and proactively managed. Many of the questions above were posed in relation to this principle. Project after project was designed to come up with answers. The test locations in the Wadden Sea were selected with the aim of designing practical

solutions. It is for this reason that the focus of this study is geographically on the western part of this area, including the Burgzand.<sup>51</sup> However, the question remains: Is the key to managing our underwater cultural heritage through in-situ preservation?

### 1.2.1 Summary of the research problem

Over the years, the focus on underwater cultural heritage has shifted from object-related archaeology to underwater cultural heritage management. This shift has occurred due to the sheer plenitude of the resource, as well as changing legislation, but also due to growing knowledge, the development of new research methods and techniques and the participation of an increasing number of stakeholders. However, as underwater heritage management is still mainly incident-driven, this has led to the question of whether long-term sustainable management underwater is viable and, if so, how this can be approached more systematically and proactively, including the more active involvement and participation of stakeholders. More specifically, the extent to which in-situ preservation should be the main goal of the management of the underwater cultural resource requires thorough investigation, given the many natural and anthropogenic threats to which it is and will be exposed.

### 1.3 Key concepts and outline of the research

The growing notion that there is cultural heritage under water must be dealt with carefully, thoughtfully and systematically. Moreover, the increasing decentralization of responsibilities demands a change in approach, encouraging the shared responsibility of different stakeholders – perhaps no less than a paradigm shift. The questions of how, under these circumstances, we should manage our underwater cultural heritage and what a firm basis for maritime and underwater heritage management might be, are not strictly 'archaeological'. Cultural heritage management (CHM) is not just about doing archaeology. CHM works with the same sites and objects, but within different

<sup>50</sup> See, for example, the Treaty of Valletta (Valletta 1992), The Icomos Charter for the Protection and Management of the Underwater Cultural Heritage (Sofia 1996), and the UNESCO Convention for the Protection of the Underwater Cultural Heritage

(Paris 2001).

<sup>51</sup> For the description of the Burgzand area, see Chapter 3.



theoretical and societal frameworks, with different goals in mind and with different sets of questions and research methodologies. Rather than asking ourselves what the past looked like, this CHM looks ahead and tries to picture what the past will look like in the future under different scenarios. CHM tries to share these visions and aims to negotiate a shared view with other stakeholders. Although CHM relies on archaeology and archaeological and historical research to understand the past, it takes a step further by evaluating and managing heritage for future society and science. This thesis starts from this CHM point of view.

Underwater cultural heritage management consists of many tasks, complex decisions to be made and includes – as part of archaeological monument care (in Dutch: AMZ-cyclus<sup>52</sup>) – desktop study as well as in-situ preservation and excavation (Fig. 1.5). Due to the strong bias towards in-situ preservation in archaeological heritage management, this thesis will primarily focus on this element of management. Maritime cultural heritage relates to the history of interaction between human societies, and water as the connection between those societies and as a means of living. As such, it informs us about an important dimension of various people's former natural and cultural environments.<sup>53</sup> It may consist of tangible heritage (such as ships, harbours or landscapes) and intangible heritage (such as traditions, social memories and narratives), which can be found in the water or on land or be preserved and transmitted by communities (in the case of intangible heritage). In this study, the focus is predominantly on cultural heritage as a material witness of the past, which society consciously recognizes as a part of its cultural legacy and is therefore willing to preserve for the future.

Maritime heritage can also be found on land, and include harbour structures and shipwrecks in former sea and river beds, such as in the IJsselmeerpolders.<sup>54</sup> Underwater cultural heritage, however, not only consists of shipwreck material or maritime infrastructures, but also of the remains of prehistoric settlements and inundated buildings that were 'flooded' and are presently situated under water.<sup>55</sup>

<sup>52</sup> Archeologische Monumenten Cyclus (AMZ).

<sup>53</sup> I am well aware that there is no common definition of 'heritage' (Ome Baron 2008, 9; Vecco 2010) or 'maritime cultural heritage'. However, 'tangible maritime heritage' can be defined here as: the material witness of the maritime past which a society wants to preserve for the future.

<sup>54</sup> Reclaimed land in the former Zuiderzee in the Netherlands.

<sup>55</sup> See Chapter 2 for in depth explanation of the definitions of underwater and maritime cultural heritage.

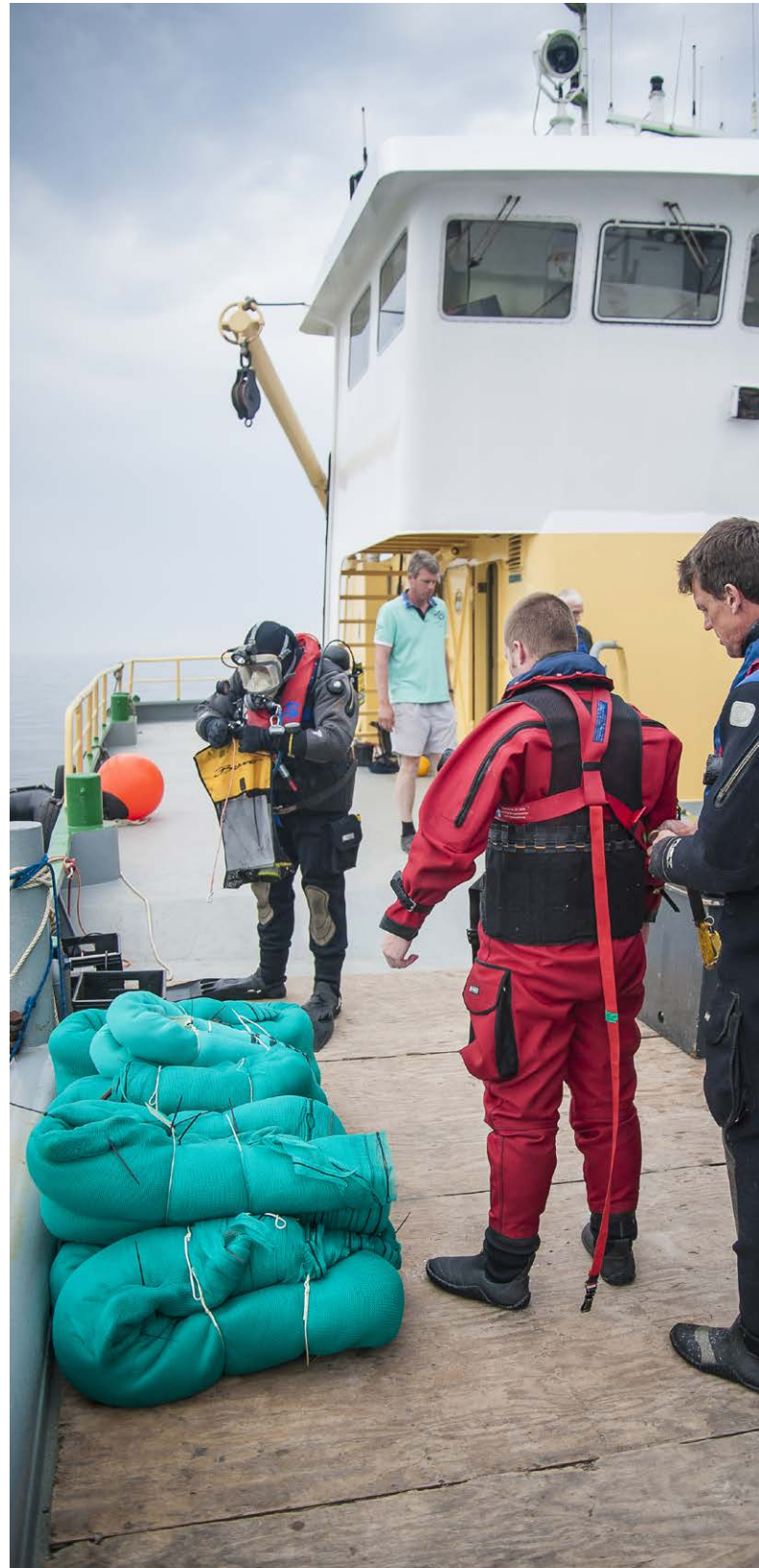


Fig. 1.5 Diver preparing for underwater protection measures. See the polypropylene nets for covering sites, front-left of the picture. Photo: Paul Voorthuis, Highzone Fotografie.



Fig. 1.6 Frames of the BZN 3 wreck before protection.  
Photo: M. Manders/RCE.

This study is devoted to maritime heritage that belongs to both categories, but it mainly consists of shipwrecks situated in an underwater environment. Thousands of ships have been lost in Dutch waters (Fig 1.6). Some private researchers, most of them active divers, have built databases recording tens of thousands of these shipwrecks.<sup>56</sup> In total, the databases of the Cultural Heritage Agency of the Netherlands consist of no less than 60,000 locations under water (Fig 1.4). This represents the combined knowledge accumulated by different stakeholders, ranging from the Hydrographic Office to sport divers and fishermen.<sup>57</sup> A few hundred underwater archaeological sites (including shipwrecks) are located in rivers. The nature of these river sites are diverse, including bridges, submerged built constructions, settlement relics and religious sites, which have all been recognized and investigated.<sup>58</sup> The same variety can be expected in other water regions in the Netherlands, such as the Wadden Sea. The reason for this is that there are few areas within Dutch territorial waters that have not been dry land during some period of the Pleistocene or Holocene. Moreover, the opposite is also true, with many 'dry' areas in the Netherlands once river or seabeds.

Although this thesis is focused on underwater maritime heritage, we can also learn about our maritime past from terrestrial research. Extensive research on shipwrecks has been undertaken on dry land, in particular in the Flevopolders. Here, 450 ship-

wrecks were located when the area was reclaimed from the sea during the 1960s and 1970s.<sup>59</sup> The Noordoostpolder and Flevopolders give us an indication of the number of shipwrecks that might still be lying on the bottom of the nearby Markermeer and IJsselmeer. Other wrecks on dry land have been found in former river branches, such as the Roman barges of Zwammerdam and Vleuten-de Meern.<sup>60</sup>

As a first delineation to its scope, this research will focus mainly on the Western Wadden Sea in the Netherlands, due to the number and condition of the underwater sites in this area. The extensive research done during the previous four decades in this area will provide the necessary data to answer the questions in this thesis.

The second delineation concerns limiting the time frame for new information used to describe natural and human processes in the area of the Western Wadden Sea and developments in law and law enforcement. This has been set – completely arbitrarily – at 1 January 2017, the moment when it became clear I was about to round up the writing of this study.

In summary, this study will analyse and discuss the methodology and future development of underwater CHM in the western part of the Dutch Wadden Sea, focusing on the material maritime heritage of this area that has been investigated more or less systematically until 2017.

#### 1.4 Research questions

Starting from the problem definition, key concepts and delineation of the scope discussed above, the research for this thesis was driven by one central question and a limited number of more specific research questions:

The central question of the thesis is: 'How can we manage the underwater cultural resource?'

The sub-questions are:

1. If possible, how can we gain knowledge about the presence of underwater cultural heritage, and of maritime underwater heritage, in particular, in the Western Wadden Sea?
2. If possible, how can we develop an approach to co-create this knowledge by means of desktop research that can serve as a basis for heritage management?
3. Shipwrecks are often found by accident. How can we better predict our chances of finding them?

<sup>56</sup> Oral communication P. de Keijzer, 'de Pluvier' diving team, Scheveningen.

<sup>57</sup> The combined databases that the RCE manages range from objects registered in ARCHIS2, the Hydrographic Office database, RWS and even that of amateur archaeologists. It is not always clear whether these locations are correct or contain sites of cultural significance.

<sup>58</sup> Some investigated examples: bridges such as the Roman bridges of Cuijk (Goudswaard 2000) and Maastricht (Vos 2004); submerged built structures such as the Castle of Elsloo (Soeters & Stassen 2002, Stoepker & Soeters 2005); the village of

Beulake (Verlinde 1979); and religious sites (Stassen 2005). The largely by avocationalists executed project 'Expeditie Over de Maas' (<http://www.overdemaas.com/nieuws/expeditie-over-de-maas> (accessed 20-12-2017)) shows the potential of (former) riverbeds.

<sup>59</sup> Some wrecks have been published. See, for example, the Flevoberichten issued by Rijkswaterstaat Directie Flevoland.

<sup>60</sup> See, for example, the overview articles by Brouwers et al. (2013 & 2015).



Fig. 1.7 The Wadden Sea at sunset. Photo: Paul Voorthuis, Highzone Fotografie.

4. Is it possible to preserve 'unknown resources' in situ?
5. What is threatening the shipwrecks in the Western Wadden Sea?
6. Is in-situ preservation a panacea for underwater cultural heritage management in general? What are the alternatives?
7. Is in-situ preservation the solution for cultural heritage management in the Western Wadden Sea? What are the alternatives?

### 1.5 Objectives

This research focuses on the management of underwater maritime heritage and the potential of applying in-situ preservation to this heritage in the Western Wadden Sea (Fig 1.7). This will be done through the analysis of data gathered over the past four decades and on the basis of recent and current (published) debates regarding this objective, both in the study area and in other areas around the world with underwater environments that are rich in maritime cultural heritage.

The specific objectives are to analyse and discuss the possibilities and impossibilities of in-situ management of archaeological sites under water and specifically the shipwrecks in the Wadden Sea (Fig. 1.8 shows the full archaeological heritage cycle, of which in-situ preservation is one option).

The aim is to dissect the most prominent issues, such as the spatial distribution and extent of underwater cultural heritage, its condition, the natural and cultural threats to which it is, and will be, exposed, the ways to protect this heritage and the effectiveness or not of protective measures. The possible ways to preserve underwater maritime heritage in situ will primarily be investigated in an evidence-based manner and from a science-based perspective, rather than on the basis of the motives, emotions and ideas expressed in public debates between different stakeholders. Nonetheless, a separate discussion about the importance of including non-scientific stakeholders in the process will be included at the end of the thesis (Chapter 7).

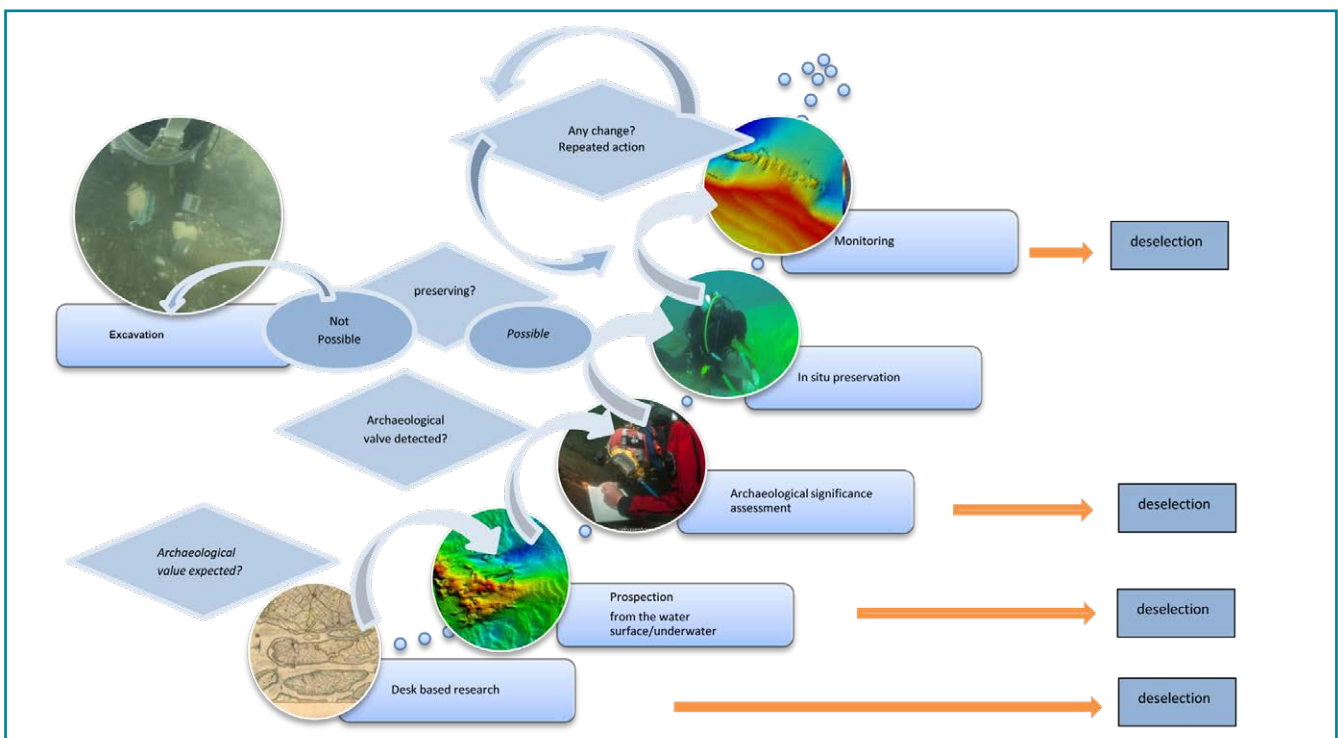


Fig. 1.8 The Archaeological Heritage Cycle. Figure: courtesy M. Manders/SASMAP.





Fig. 1.9 The Wadden Sea Area. Figure: CORINE land-use map, Menne Kosian/RCE.

## 1.6 A case study approach: the Dutch Wadden Sea

### 1.6.1 Research area: the Western Wadden Sea

This thesis focuses on the western part of the Dutch Wadden Sea and the former location of the Texel Roads in particular, with the Burgzand area at its centre. Historically, this is where ships were loaded and unloaded, primarily for the Amsterdam market.<sup>61</sup> Much about the geological development of the Western Wadden Sea area has already been described in a series of publications, of which *De Convexe Kustboog* (the 'Convex Coastal Arch'), by Henk Schoorl, from 1999,<sup>62</sup> deserves specific mention. Intensive archaeological research has also been done on the Texel Roads, mainly by government archaeologists, who have focused on the many well-preserved shipwrecks that have been discovered over the decades.<sup>63</sup> Historians have paid special attention to the role of this area in the Golden Age and the Dutch East India Company (Vereenigde Oostindische Compagnie or VOC).<sup>64</sup> However, the importance of the area as a roadstead is much greater and stretches over a longer period of time. It was not only used by ships going to the East and West Indies, but also by warships, merchant ships heading for or returning from the Baltic and elsewhere, and it functioned as such from at least the sixteenth to the twentieth century.

The Wadden Sea is an intertidal zone in the southeastern part of the North Sea. It stretches from the northern Netherlands coast to Germany and the western part of Denmark and consists of a shallow body of water with tidal flats and wetlands. The Wadden Sea is separated from the North Sea by a series of barrier islands with tidal inlets in between. It is also a UNESCO World Heritage Site. The Dutch and German territories were recognized in 2009, and it was extended in 2014 with the recognition of the Danish territory (Fig. 1.9).

In several areas, the Dutch part of the seabed of the Wadden Sea is very dynamic. Processes of sedimentation and erosion alternate at different rates.<sup>65</sup>

<sup>61</sup> See also Chapter 3.

<sup>62</sup> Schoorl 1999/2000.

<sup>63</sup> See, for example, Vos 2012.

<sup>64</sup> See, for example, Roeper & Vonk-Uitgeest (eds) 2002.

<sup>65</sup> Considerable research has been conducted regarding the sea floor in the Wadden Sea area. See also: Oost 2009, Manders 2009(2), Elias et al. 2012, and Brenk & Manders 2014, Manders et al. 2014.



Fig. 1.10 The Afsluitdijk, Photo: Courtesy RCE.

The Wadden Sea is especially susceptible to these processes, as is the North Sea.<sup>66</sup> In the Wadden Sea, gullies can move or change direction over time under the influence of tidal currents.<sup>67</sup> These channels leave traces in the landscape down to the Pleistocene substrata.<sup>68</sup> In some places, Pleistocene sediments are exposed on the surface of the seabed, while in others the Pleistocene strata have disappeared and been eroded by channels or covered with a layer of Holocene sand several metres thick.<sup>69</sup>

Just as the area is constantly being shaped by nature and by humans, so is the seabed. One particular human activity that had a direct and substantial effect on the seabed was the construction of the Afsluitdijk in 1932, between the provinces of North Holland and Friesland (Fig. 1.10).<sup>70</sup> This construction blocked the dominant currents, which rapidly changed the pattern of channels and plates.<sup>71</sup> In addition, by building the dike, the IJsselmeer and Markermeer were isolated from the effects of ebb and flow currents. Since the 1930s, no major changes have subsequently taken place on the former seabed in these lakes except for a massive amount of silt that has settled on the former seabed deposited by the rivers.<sup>72</sup>

The dynamics of the mobile Holocene top strata largely determine whether any heritage has been preserved in the soil, as well as the condition of that heritage at any moment.<sup>73</sup> It is therefore important to gain insight into the condition of the sediments, as well as how they have moved over the past centuries.

The focus in this thesis will be on wrecks submerged at all times. However, it is inevitable that the Wadden Sea Area as a whole needs to be taken into account. This area extends from the waters of the Wadden Sea itself far inland, to the point where the influence of the sea disappears.<sup>74</sup> Human and natural processes occurring in the sea and the land adjacent to it play an important role in the decision about what and how to manage and when to preserve sites in situ. People affect management, land affects water; a site is influenced by its context and vice versa.

### 1.6.2 A short history of the Wadden Sea

The current Western Wadden Sea was only created in the late twelfth century.<sup>75</sup> Before then, the area consisted largely of more or less inhabitable land.<sup>76</sup>

<sup>66</sup> See, for example, Eelkema et al. 2012.

<sup>67</sup> On the moving of gullies in the Wadden Sea, see, for example, the studies by Schoorl 1999 (Part 1, 14–34) and Oost 1995.

<sup>68</sup> See Figs. 1.8 and 1.17 A.

<sup>69</sup> See Fig. 1.20.

<sup>70</sup> See, for example, CPSL 2010, 41.

<sup>71</sup> See Fig. 1.27.

<sup>72</sup> Wiersma & Verweij 2012, 4. Prior to the construction of the Afsluitdijk, the area had been subjected to the same sea-floor dynamics as the Wadden Sea, especially in the immediately adjacent northern section. See also Schoorl et al. 1999.

<sup>73</sup> See also Chapters 2 and 3.

<sup>74</sup> See, for example, Wadden Sea Plan 2010, 5 and Frederiksen n.y.

<sup>75</sup> See for a detailed description of the early development: Schoorl 1999, part 1.

<sup>76</sup> Schoorl 1999, part 1.

Starting in the twelfth century, the Wadden Sea became an easily navigable waterway due to the large breakthrough of the North Sea into the area.<sup>77</sup> From the sixteenth century onwards, the western part of the Wadden Sea became part of the economic heart of the Netherlands, with a strong connection to the international harbour of Amsterdam, and the Texel Roads as the point of departure and destination for voyages to the colonies in the East and West.<sup>78</sup> Dozens of ships would regularly remain anchored in the Roads, waiting for fair winds.<sup>79</sup> This lively and hectic environment, combined with the strong and treacherous currents, the shallows and poor weather conditions, earned the Western Wadden Sea a reputation as an area with a high density of shipwrecks.<sup>80</sup> It now contains many maritime archaeological remains dating from the sixteenth to the twentieth centuries, especially shipwrecks.<sup>81</sup> The tides and subsequent erosion and sedimentation patterns make shipwrecks regularly disappear and reappear again.

The dynamic sea floor has helped to preserve many of these wrecks and has done so since the moment they arrived there. This has resulted in many still being in a relatively good condition.<sup>82</sup> However, some of this heritage is currently threatened by seabed erosion.<sup>83</sup> Sites protruding from the seabed surface are exposed to a wide range of biological, chemical and mechanical degradation processes.<sup>84</sup>

This huge potential of shipwrecks and their exposure due to erosion of the seabed over centuries has attracted adventurous divers, many from the islands and the mainland adjacent to this sea. The involvement of local stakeholders is very high, as the history of the maritime world and the heritage of maritime ways of life are an integral part of the identity of the communities in the area. Each and every person is strongly connected to the sea and this connection often goes back many generations. Early divers from the islands discovered a vast number of wrecks in the 1970s and 1980s. These formed the basis of a shipwreck inventory in the Netherlands. Many artefacts have been taken from these wrecks and form an important part of the collections of local museums.<sup>85</sup>

This local intervention in and influence on underwater cultural heritage management has in recent years been scaled up to a more regional and even national level, partly due to the decentralization of cultural heritage management to the municipality level, and partly due to the fact that the Wadden Sea has been granted World Heritage status.<sup>86</sup> To manage the area, many decisions on specific maritime activities in the area had to be made at the national level;<sup>87</sup> however, these decisions still required input from the local community.

The Wadden Sea's World Heritage status is based primarily on its natural value.<sup>88</sup> According to the UNESCO, the Wadden Sea is:

the largest unbroken system of intertidal sand and mud flats in the world. It is a large, temperate, relatively flat coastal wetland environment, formed by the intricate interactions between physical and biological factors that have given rise to a multitude of transitional habitats with tidal channels, sandy shoals, sea-grass meadows, mussel beds, sandbars, mudflats, salt marshes, estuaries, beaches and dunes. The area is home to numerous plant and animal species, including marine mammals such as the harbour seal, grey seal and harbour porpoise. The Wadden Sea is one of the last remaining large-scale, intertidal ecosystems where natural processes continue to function largely undisturbed.<sup>89</sup>

However, people have also lived in the area for many centuries. They have altered and used the space on the basis of what they thought right or what would profit them in one way or another. The area, the landscape, as well as the sea, was shaped and still is being shaped through the interaction of human activities and natural processes.<sup>90</sup> The regional landscape, including the Wadden Sea, therefore, shows clear evidence of how people have used it over time.<sup>91</sup> One collection of such evidence is its shipwrecks.

In almost 40 years of continuous underwater archaeological research in the Wadden Sea, it has become clear that the cultural value of the area, as is also illustrated by the rich archaeological remains, is just as unique as its natural value. Both are an

<sup>77</sup> Schoorl 1999, part 1.

<sup>78</sup> Jacobs 1996, 36, Bonke 2002.

<sup>79</sup> Bonke 2002.

<sup>80</sup> Habermehl 2000, Akker et al. 2007, Koeveringe et al. 2011, Vos 2012.

<sup>81</sup> See e.g. Kleij 1991, Vos 2012, Koeveringe et al. 2011.

<sup>82</sup> Huisman et al. 2008. For a long time, it was thought that shipwrecks in the Wadden Sea would sink into the soft Holocene layers, finally resting on the harder Pleistocene strata. OSL Research in the MACHU project (Manders, Van Os & Wallinga 2009 (1) and 2009 (2)) revealed that this is not true in all cases. For example, after hundreds of years, the BZN 10 wreck ended up on a sand layer from the fourteenth century, possibly an old sandbank.

<sup>83</sup> Os & Kosian 2011, Brenk & Manders 2014. See also Chapter 3.

<sup>84</sup> See also Chapter 3.

<sup>85</sup> See, for example, the collections at Kaaps Kil (<http://www.kaapskil.nl/>, accessed 29-01-2017) and Wrakkenmuseum Terschelling (<http://wrakkenmuseum.nl/>, accessed 29-01-2017).

<sup>86</sup> See Willems 1999 and [www.waddensea-worldheritage.org](http://www.waddensea-worldheritage.org) (accessed 08-04-2017).

<sup>87</sup> See, for example, Leeuwen et al. 2008 and Ministerie van Landbouw, Natuur en Voedselkwaliteit n.y.

<sup>88</sup> See also Reise 2013.

<sup>89</sup> <http://whc.unesco.org/en/list/1314> (accessed 29-01-2017).

<sup>90</sup> See, for example, Vonhögen-Peeters et al. 2013, 1611.

<sup>91</sup> See, for more about the development of the area, Vollmer et al. 2001.



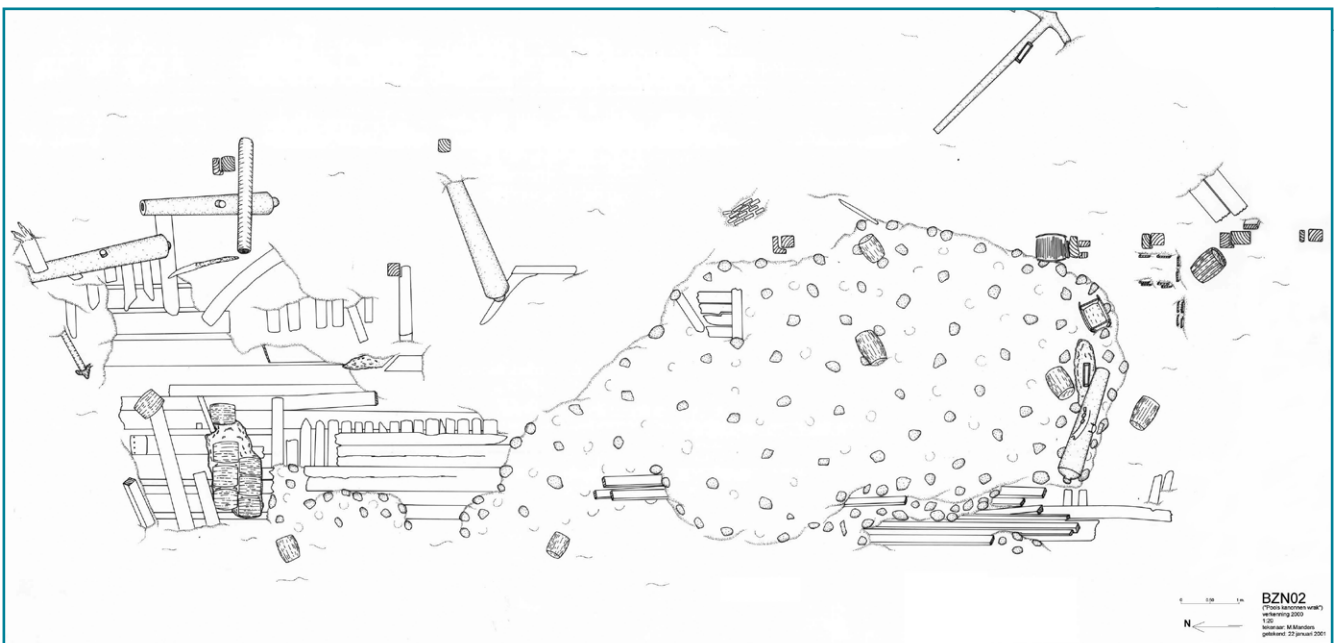


Fig. 1.11 Site plan of the BZN 2 wreck. Figure: courtesy M. Manders/RCE.

important and integral part of the identity or 'DNA' of the area. Even nature has partly been shaped by the activities of people here: it is, for example, one of the most diked seas in the world, with all the geological and natural particularities that accompanied this human intervention.

The aim for many of those who focus on the cultural importance of the area is to preserve the archaeological remains from the violent natural environment. However, the way people want to do this differs from person to person and from stakeholder group to stakeholder group. Some would prefer to remove all the artefacts before they deteriorate too much or even disappear; others would prefer preservation in situ. The latter solution, especially, has gained ground among archaeologists and cultural heritage managers. Professionally, in-situ preservation is the first option and this also counts for the wrecks that have been discovered in the Western Wadden Sea.

### 1.6.3 The shipwrecks in the Western Wadden Sea

Only the Burgzand wrecks – forming the majority of the shipwrecks in the study area – will be briefly introduced here. I say briefly, because quite a few books and articles have been published over the years with detailed information about the archaeological content and historical significance of the wrecks. The reader is encouraged to turn to these for further information.<sup>92</sup> Information about wrecks outside the Burgzand area used in this thesis will be included when first mentioned.

#### The Burgzand Wrecks

This thesis heavily builds on information gathered while doing research on shipwrecks in the Western Wadden Sea. Within this area, the main focus of work in recent decades has been on the sites that are located in what is now known as the National Monument of the Burgzand (No. 15660).<sup>93</sup> It consists of fourteen

known wrecks from the seventeenth and eighteenth centuries and one possible wreck (BZN 19).

All wrecks have a toponym starting with BZN (Burgzand Noord) and then a number. Not all numbers have been used in order. For example, BZN 1, 5, 6 and 7 do not exist due to the incorrect naming of sites or the merging of different locations which turned out to be one. Initially, national protection was only granted to the site of the BZN 3. The process of protection started in 1988, with registration completed in 1991. However, in 2013, the national monument area was extended to include more wrecks. Those that have been discovered so far are:<sup>94</sup>

#### BZN 2

The wreck of a mid-seventeenth-century ship was discovered in 1985. It had a cargo of cannons, of which many were bronze field pieces from Poland (Fig. 1.11). These objects gave it its popular name the 'Polish Cannon Wreck'. Ballast stones, lead ingots, boxes with tin and copper, as well as wooden beams for trading were also found and partially salvaged. The site has been partly protected in situ with polypropylene nets.<sup>95</sup>

#### BZN 3

The wreck of a mid-seventeenth-century ship was discovered in 1985 and is believed to be the remnants of the East Indiaman *De Rob* (Fig. 1.12). One salvaged bronze cannon was manufactured by Everardus Splinter in Enkhuizen for the Admiralty of Amsterdam and bears the year 1638. Dendrochronology dating revealed a date of 1640 +/- 5 for some of the wooden remains.<sup>96</sup>

*De Rob* was added to the Admiralty fleet in 1629 and fought in the Battle of Duins in 1639. The ship sank on the Texel Roads in 1640. BZN 3 was designated a national monument in 1991 and was protected in situ in 1988 with polypropylene nets and approxima-

<sup>92</sup> Habermehl 2000, Vos 2012 and [www.maritiem-erfgoed.nl](http://www.maritiem-erfgoed.nl) (accessed 22-1-2017).

<sup>93</sup> See <http://www.cultuur.nl/upload/documents/adviezen/Texel-zes-scheepswrakken.pdf> (accessed 29-01-2017).

<sup>94</sup> This was the situation in December 2015; since then another wreck has been discovered (BZN 20), but no further information about this find was known at

the time of writing.

<sup>95</sup> See also Koeveringe et al. 2011, 49 and Vos 2012, 109–143 and e.g. Chapter 5 of this thesis.

<sup>96</sup> Manders 2005, Saß-Klaassen & Vernimmen 2005.





Fig. 1.14 Site plan of the BZN 8 wreck. Figure: courtesy M. Manders/RCE.

shipwreck is often referred to as the VOC ship, the *Lelie* (1654). This, however, cannot be correct due to a mismatch in dating between the sinking of the ship and the date on the bell. The wreck has been physically preserved in situ.<sup>102</sup>

### BZN 9

The wreck of a seventeenth-century ship. Local divers call it the 'Two Cannon Wreck' or 'Twee Kanonnen Wrak', although many more were discovered on this site (Fig. 1.15). Parts of the wreck have been excavated; other parts are protected in situ.<sup>103</sup>

### BZN 10

The wreck of a late seventeenth-century merchantman. It is believed to be of Northern German origin and involved in trade with the Iberian Peninsula (Fig. 1.16). It had a large cargo of Iberian jars in its hold, but also casks of anchovy and grapes. The site is protected in situ and has served as the focal point for degradation and underwater in-situ research in the Netherlands. BZN 10 was also once identified as the *Lelie*. Again, as with BZN 8, this identification was false.<sup>104</sup>

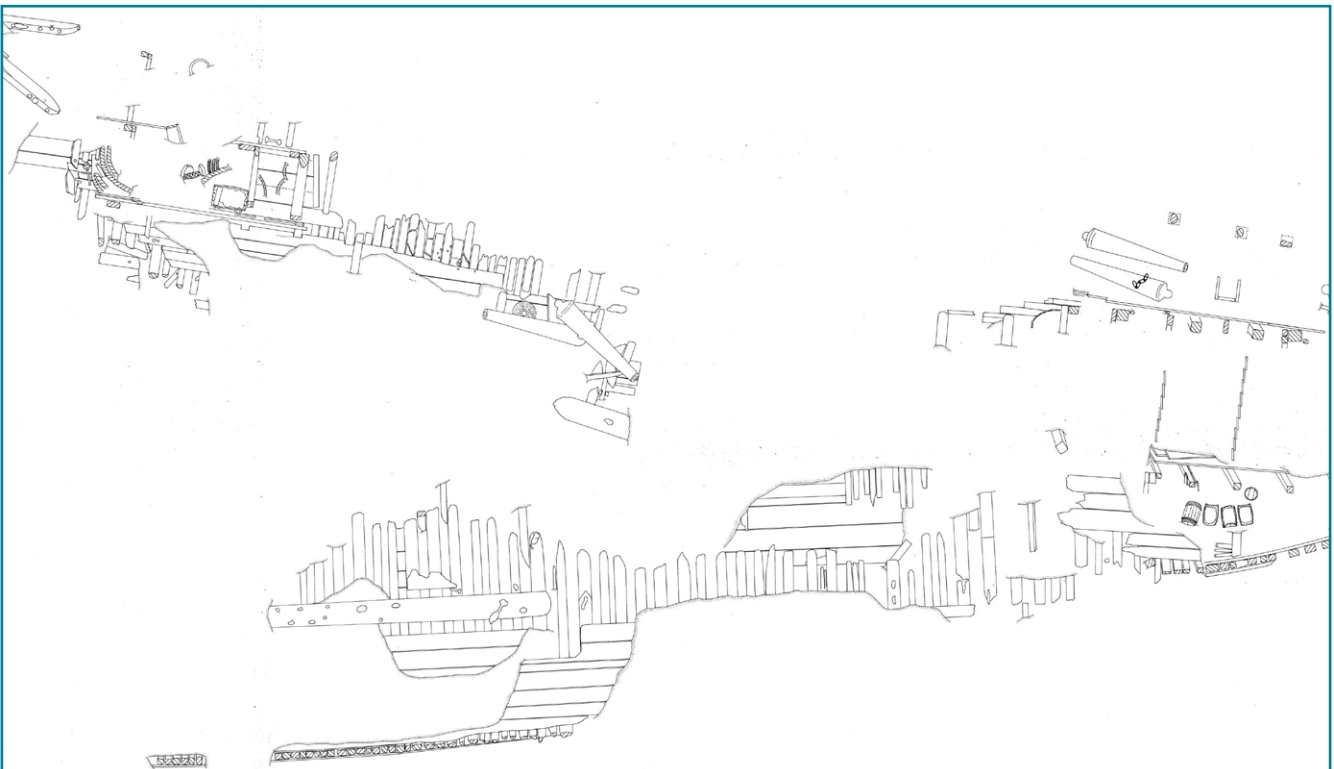


Fig. 1.15 Site plan of the BZN 9 wreck. Figure: courtesy M. Manders/RCE.

<sup>102</sup>[http://www.maritiemprogramma.nl/nieuws/MP\\_n\\_topsites\\_21-6-13.htm](http://www.maritiemprogramma.nl/nieuws/MP_n_topsites_21-6-13.htm) (accessed 02-04-2017).

<sup>103</sup> [MP\\_n\\_topsites\\_21-6-13.htm](http://www.maritiemprogramma.nl/nieuws/MP_n_topsites_21-6-13.htm) (accessed 02-04-2017).

<sup>104</sup> 03 (1), Holk 2003, Vos 2012, 244–265.





Fig. 1.16 Site plan of the BZN 10 wreck. Figure: courtesy M. Manders/RCE.

### BZN 11

The wreck of a seventeenth-century ship. It is referred to as the 'Big Empty' or 'Groot Leeg' by local divers. This wreck consists of only part of the ship's construction (Fig. 1.17). No inventory, cargo or personal belongings were discovered. The wreck has deliberately not been physically protected in order to serve as a 'control' wreck for the effectiveness of in-situ protection methods.<sup>105</sup>

### BZN 12

The wreck of another seventeenth-century ship (Fig. 1.18). Known as the 'Yellow Stone Wreck', it contains a heavy cargo of yellow 'IJssel' stones (bricks). After the initial assessment of its significance it has not been subject to further research.<sup>106</sup>

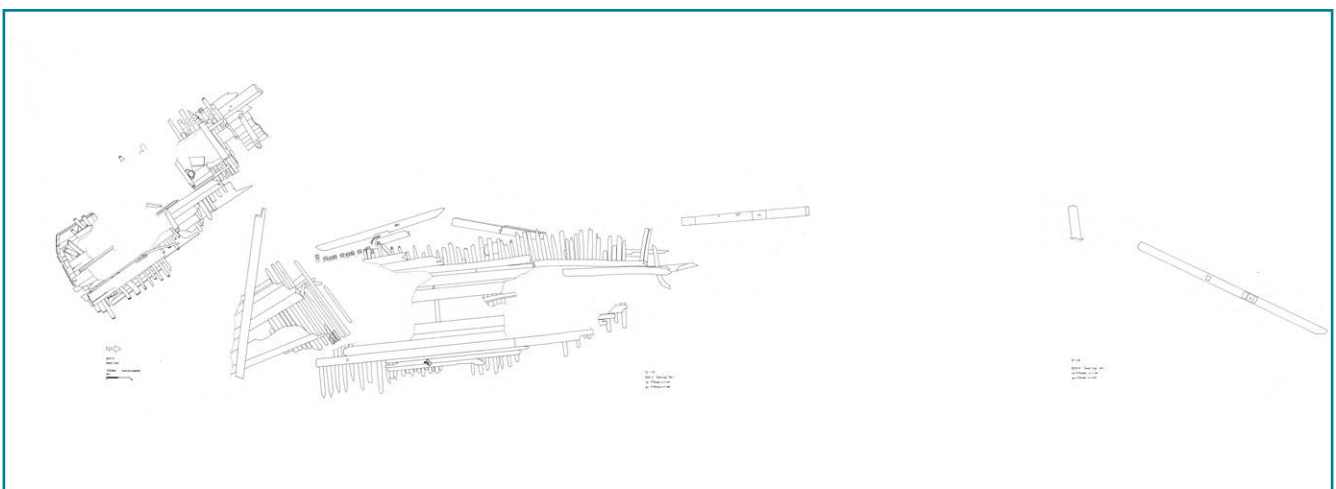


Fig. 1.17 Site plan of the BZN 11 wreck. Figure: courtesy M. Manders/RCE.

<sup>105</sup> See also Vos 2012 266–279.

<sup>106</sup> See also Vos 2012, 280–288.

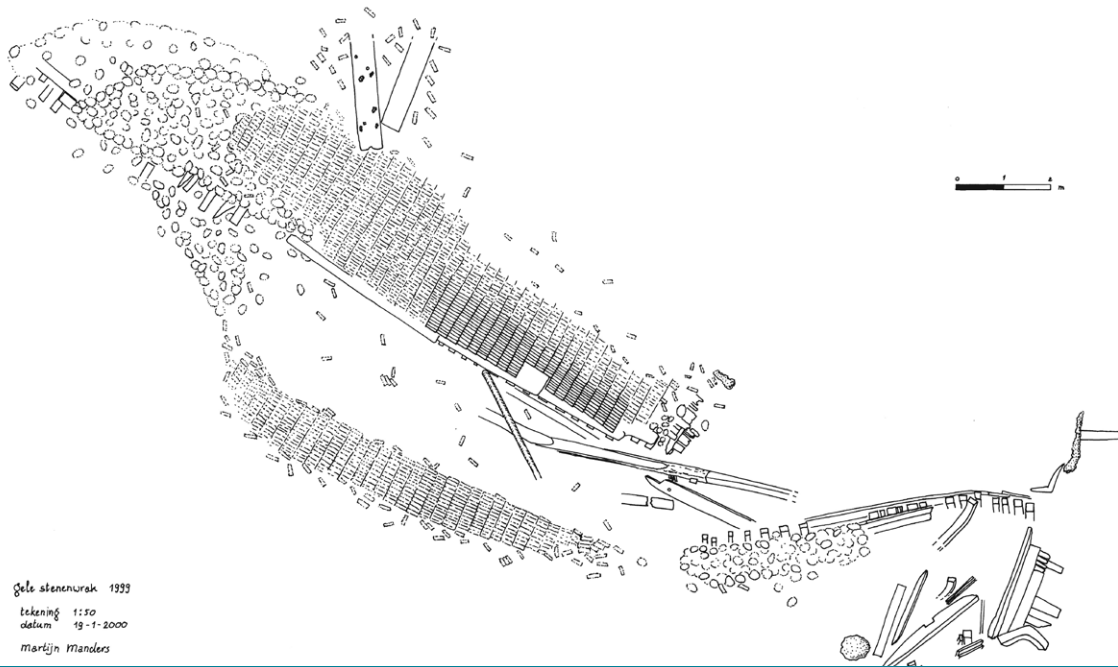


Fig. 1.18 Site plan of the BZN 12 wreck. Figure: courtesy M. Manders/RCE.

### BZN 13

Shipwreck, probably of an eighteenth-century ship (Fig. 1.19). This wreck earlier had the toponym Texelstroom 13. It has a double layer of outer planking, of which one had the function to protect the ship construction against shipworm. This is an indication that the ship was used in tropical waters.<sup>107</sup>

### BZN 14

The wreck of a seventeenth-century ship (Fig. 1.20). An enormous number of ballast stones were found on the wreck. This gave it the name of the 'Potter Wreck' by local divers. This ship also had a double layer of planking to protect it against shipworm. The aft of the ship has been excavated. Casks of fish, pepper,

grain seeds, rice, cucumber and beans were discovered. This food stuff may well have been used on board. During research, pieces of coral were also found between the ballast stones. In addition to the double layer of planking, this is an indication of its use in tropical waters.<sup>108</sup>

### BZN 15

The Burgzand Noord 15 (BZN 15) site is a shipwreck that sunk on the Dutch Texel Roads in the seventeenth century (Fig. 1.21). The site is almost 50 by 30 metres. We do not know the exact size of the original ship, as the site consists of different fragments of a shipwreck scattered across the entire area. In the south, there is a large area where ballast stones and concretions of iron from at

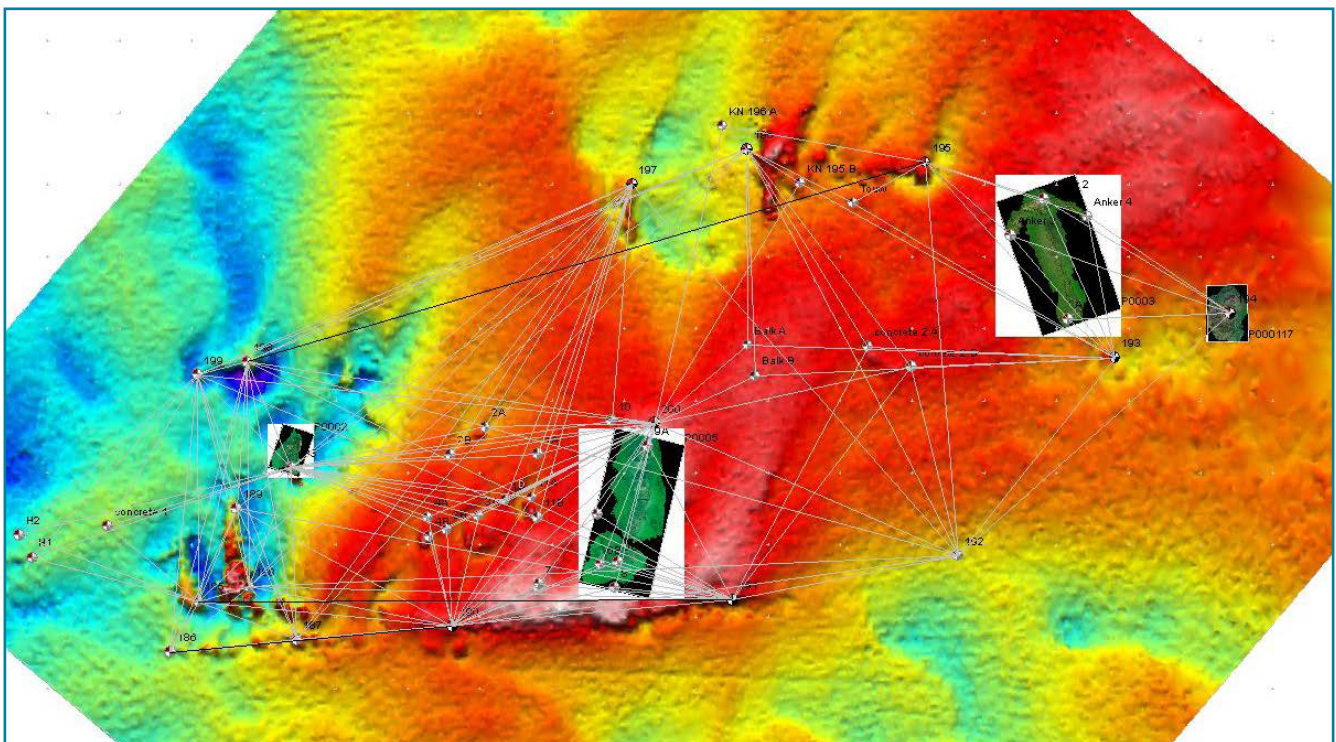


Fig. 1.22 Multibeam, site recorder data and Agisoft photogrammetry images of the BZN 17 wreck. Figure: courtesy Perplus/T.Coenen/RCE.

<sup>107</sup> See also Vos 2012, 288–294.

<sup>108</sup> See also Vos 2012, 294–310.

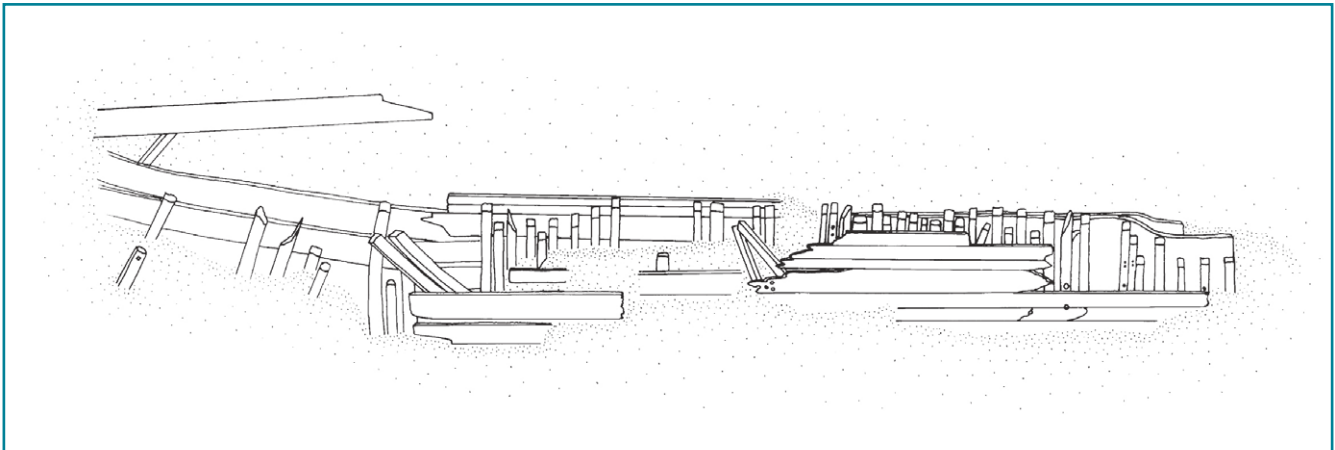


Fig. 1.19 Site plan of the BZN 13 wreck. Figure: courtesy M. Manders/RCE.

least two cannons and many iron cooking pots have been located. Hundreds of clay pipes were also found in this area. At some distance to the north, a cargo of wrought-iron staves is situated on the sea bottom. Under this, many rolls of brass were found. In these two places, there is no wood in situ. In the northern section of this site, on the edge of an old sandbank, the fragments of a shipboard were found, together with the construction of a deck. This part was deteriorating very fast. It had been slowly sliding off the bank, and most of the wood was permanently exposed to erosion and wood-boring organisms. Earlier dendrochronology dating revealed that this fragment must be from a ship that was built not long after 1641 (the youngest dating).<sup>109</sup> It was a shell-first carvel-built vessel carrying a cargo of half products possibly from the Baltic.

The depth of the site is 10 to 15 metres at high tide. This site was investigated and monitored during the BACPOLES project.<sup>110</sup>

### BZN 16

Wooden wreck parts were discovered in 2002. However, these have not been seen since and may have disappeared due to the ongoing erosion in that part of the Burgzand.<sup>111</sup>

### BZN 17

This wreck is probably a seventeenth-century ship, discovered by local divers in 2009 (Fig. 1.22). A quick survey in 2014 informed us that a fairly well-preserved shipwreck was lying upright on its keel in the sediment, preserved up to the first deck. This is quite unique in a dynamic environment such as the Wadden Sea. Locally observed deep holes indicate that some illegal excavation has taken place through the protective sand and even the clay layer. This has made the wreck especially vulnerable to mechanical, chemical and biological deterioration.<sup>112</sup> The local divers have salvaged extremely well-preserved clothing, possibly including a Royal British dress.<sup>113</sup>

### BZN 18

Undated wooden shipwreck, only discovered in 2011, but erosion has exposed the wreck in a short period of time. The wood of the wreck is heavily deteriorated due to shipworm, which demonstrates that the site has been exposed on numerous occasions. In 2016, the large erosion holes had already disappeared and the site was sanding in.<sup>114</sup>

### BZN 19

Structures of possibly yet another shipwreck were discovered during the monitoring of the Burgzand Designated area in 2014. Not much else is known at the moment.

These are the wrecks that have been discovered thus far in an area of 1200 by 600 metres.<sup>115</sup> BZN 17, 18 and 19 show the huge potential to discover even more wrecks in the North Burgzand area itself, or just beyond on the greater Texel Roads.

## 1.7 Methodology and theoretical concepts

### 1.7.1. Underwater archaeology, maritime archaeology and cultural heritage management

The question of whether we can manage our underwater cultural resource is broad and needs to be investigated on many levels. Using the existing archaeological heritage cycle (Fig. 1.8) for guidance and the Western Wadden Sea as a test area, I will first look at what the resources encompass. To make the resources – known and unknown or potential resources – visible I will use a new method called the Historical Geomorphological Map Set (HGMS).

The resources have their value but are under threat. Only by revealing them can we mitigate against this threat. Most of the threats have already been extensively researched during the successive EU projects mentioned in Section 3.1, and the methods used to investigate and measure the human impact

<sup>109</sup> Vos 2012, 315

<sup>110</sup> See also Vos 2012, 310–320, Manders 2005 (1).

<sup>111</sup> See also Vos 2012, 320–324 and Brenk & Manders 2014, 48–50.

<sup>112</sup> See also Chapter 3.

<sup>113</sup> [https://www.theguardian.com/world/2016/apr/21/400-year-old-dress-found-in-](https://www.theguardian.com/world/2016/apr/21/400-year-old-dress-found-in-shipwreck-sheds-light-on-plot-to-pawn-crown-jewels)

[shipwreck-sheds-light-on-plot-to-pawn-crown-jewels](https://www.theguardian.com/world/2016/apr/21/400-year-old-dress-found-in-shipwreck-sheds-light-on-plot-to-pawn-crown-jewels) (accessed 29-01-2017).

<sup>114</sup> Own observations by author.

<sup>115</sup> As much continues to occur in the area while writing, as mentioned above, the most recent date used for thesis is 1 January 2017.



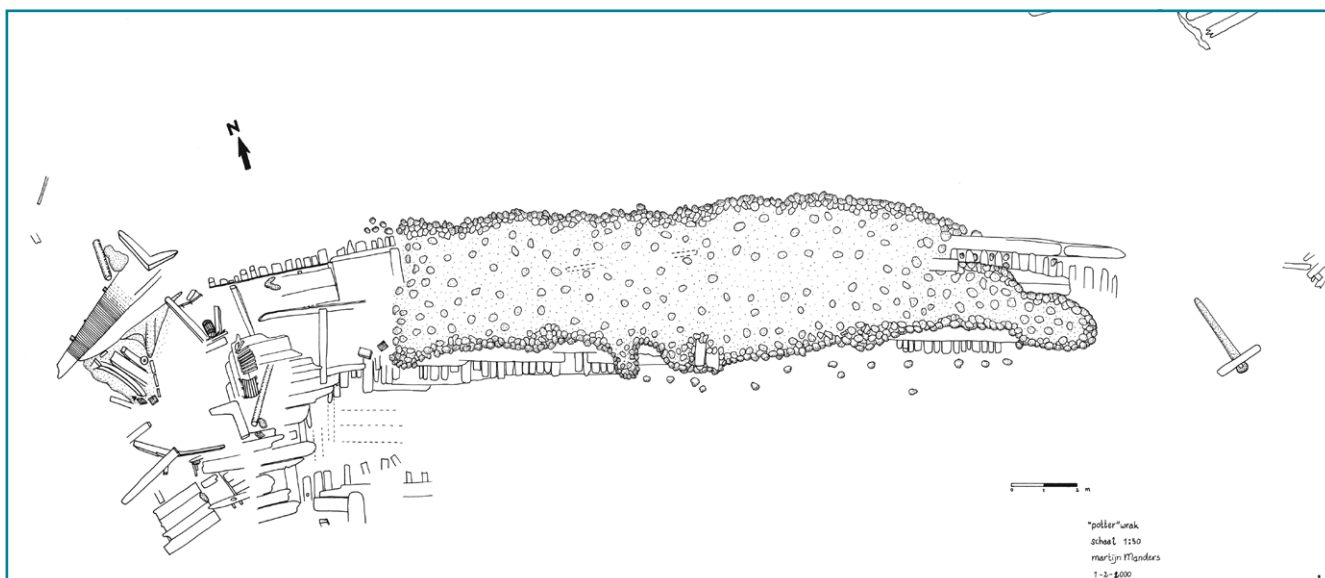


Fig. 1.20 Site plan of the BZN 14 wreck. Figure: courtesy M. Manders/RCE.

and, especially, biological, mechanical and chemical deterioration, have been developed. In the management of cultural heritage, prioritizing is of crucial importance. As a baseline for doing this, heritage managers need thorough knowledge of the exact locations of underwater heritage, the values attributed to this heritage and the factors and actors that threaten its survival and sustainable management. This all forms the basis for making a decision between preserving a site in situ or ex situ, or not taking action at all.

Ex situ preservation, which actually involves the safeguarding of the resource, is archaeologically done through excavation in one form or another. In-situ preservation entails the maintenance of a site in the place where remains have been found. This is one of the drivers in important international treaties, such as that of Valletta and the UNESCO Convention for the Protection of the Underwater Cultural Heritage. Nevertheless, while being so prominent in official management policy and formal treaties, it is important to critically consider the 'in-situ paradigm' for underwater cultural heritage management. Is it a panacea or wonder pill (Fig 1.24)? This will be investigated in the light of the threats to and potential of the maritime underwater cultural heritage resource in the study area. Before explaining and implementing this general methodology in the chapters that follow, in this section, I first discuss some key concepts that figure prominently in the field. Methodological concepts that relate to the practical issue of preservation and management of underwater archaeological resources will be introduced briefly in Section 1.7.2.

Archaeology can be described as '[t]he systematic study of past human life and culture by the recovery and examination of remaining material evidence, such as graves, buildings, tools, and pottery'<sup>116</sup> or as that which 'studies aspects of human life in the past through the material remains, which are often concealed by

soil'.<sup>117</sup> Although these definitions differ, both entail the effort to reconstruct past life and behaviour through the study of material sources and resources. Archaeology can also be described as a toolbox of methods and techniques available to us for the investigation of the physical remnants or traces of humankind with the aim of gaining knowledge about our past.<sup>118</sup> These definitions equally suit archaeology on land and under water.

As explained in Section 1.1, underwater archaeology, as a subdiscipline of archaeology, can be described in terms of the methods and techniques we use to investigate those sites that are presently situated under water, be it shipwrecks, inundated cultural landscapes and settlements (even entire cities), or even aeroplanes. Underwater archaeology is thus defined in a technical sense as a methodological subdiscipline of archaeology.

Maritime archaeology is the set of theories, concepts, methods and techniques that we use to investigate the role of water and water systems as connectors of past societies and as a means of living, and as such as an integral part of the cultural environment of past human societies. Maritime archaeology consists of the study of shipwrecks, but also of canals, harbours, natural water systems (rivers, lakes, etc.) and other structures that relate to the diverse interactions between human societies and water.<sup>119</sup>

Although often complementary, underwater cultural heritage and maritime cultural heritage are not exactly the same. Underwater archaeology studies sites that happen to be under water at the time of investigation but which are, in principle, not necessarily related to the above-mentioned relationships between humans and water. The fact they are presently situated in underwater contexts may be a coincidence (e.g. due to sea level rise or the recent construction of lakes).

<sup>116</sup> The American Heritage Dictionary of the English Language, Fourth Edition. (2003). Accessed 29-01-2017 from <http://www.thefreedictionary.com/archaeology>

<sup>117</sup> The full original Dutch definition that I have used: 'Archeologie: bestudeert (aspecten van) menselijke samenlevingen in het verleden op grond van materiële resten (vondsten/bodemsporen), die vaak door de bodem aan het oog onttrokken zijn (bodemarchief). Kenmerkend is de methode van het oudheidkundig bodemonderzoek (opgraven)' on <http://www.encyclo.nl/begrip/archeologie>

(accessed 29-01-2017).

<sup>118</sup> With the term 'toolbox' I want to make a distinction between the – in my view – incorrect association of the word 'archaeology' with the physical objects and traces in the soil. 'Archaeology' concerns the profession, the handling, the activity of investigating and reconstructing on the basis of these physical objects.

<sup>119</sup> See, for a more detailed definition, Chapter 2.

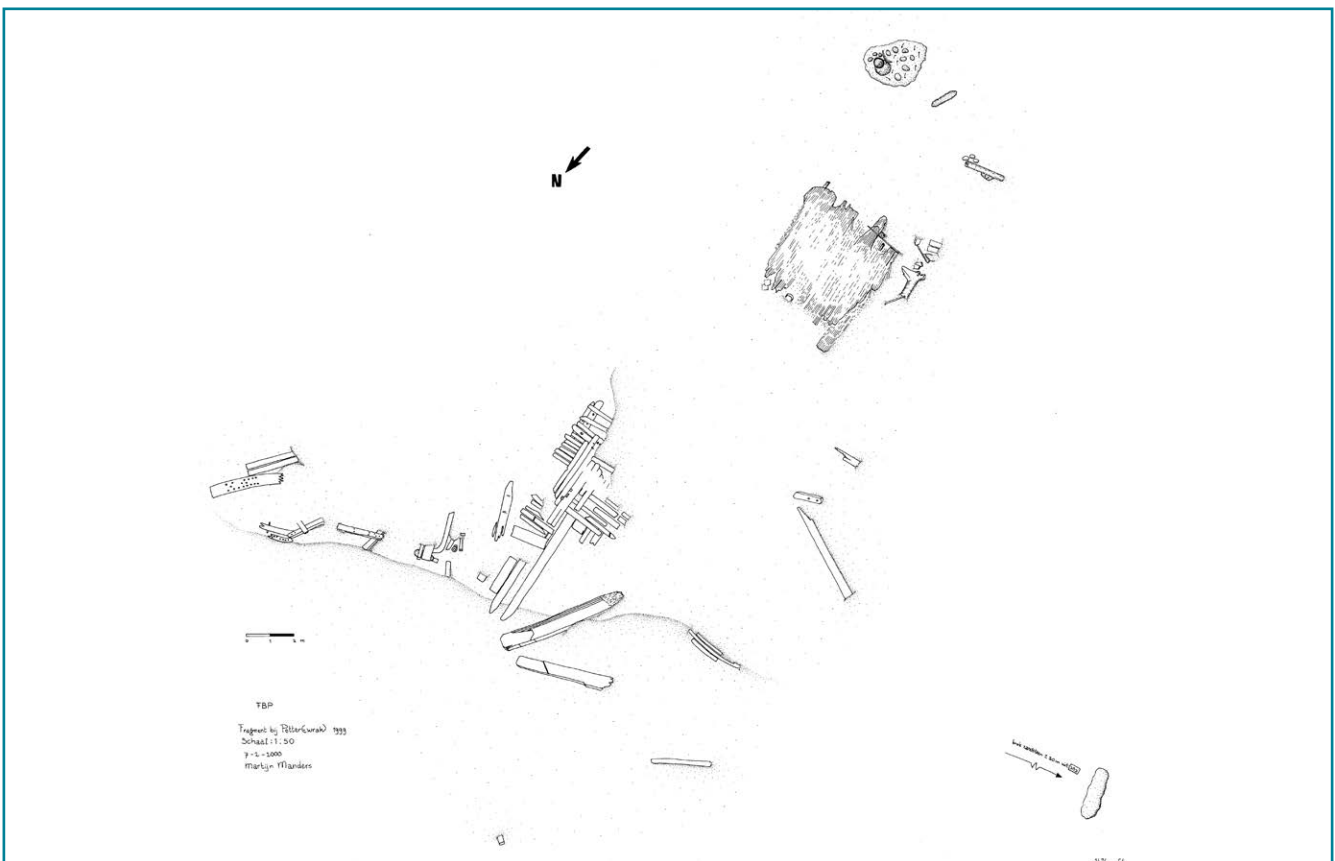


Fig. 1.21 Site plan of the BZN 15 wreck. Figure: courtesy M. Manders/RCE.

Maritime sites, on the contrary, may even be situated on land but are defined as part of the historical 'maritime cultural landscape'.<sup>120</sup> The maritime cultural landscape comprises the entire network of sailing routes, old as well as new, with ports and harbours along the coast, and the related constructions and remnants of human activity, under water as well as terrestrial.<sup>121</sup> It concerns the use of maritime space by boats and other transport mechanisms that make use of water. It comprises, therefore, not only shipwrecks, but also settlements, as well as fishing, hunting and shipping activities in the broader sense and their attendant subcultures, such as pilotage, lighthouses and seamark maintenance.<sup>122</sup> Moreover, it not only consists of artefacts, sites and artificial structures that relate to water as an important material resource, for an important part of the maritime cultural landscape is also intangible, cognitive or indicative. An area may be valued highly due to traditions and potential use.

Maritime cultural heritage offers us a relic and is an expression of the ways of living developed by a community in relation to water systems, which are passed on from generation to generation, including customs, practices, places, objects, artistic expressions and values. Cultural heritage often takes the form of intangible or tangible resources.<sup>123</sup> As explained above, this study focuses predominantly on the tangible aspect: the physical heritage of the maritime past and/or material heritage that is located under water. Tangible heritage can, however, only be interpreted properly by taking its intangible aspects into consideration as

well.<sup>124</sup> Material objects may appear meaningless by themselves, only deriving their value, importance and meaning from the narratives, memories and associations with their historical context, and the cultural values that are currently attached to material traces in the present. Heritage is often also described as collective memory, as a social construct shaped by the political, economic and social concerns of the present.<sup>125</sup> The current meanings and values of ancient objects can also be shaped by recent notions of nationality, religion, ethnicity, class, wealth, gender and personal history. With such a variety of parameters that determine what heritage is, it might be better not to talk about heritage in the singular, but about heritages. For the sake of clarity, however, in this study I will talk about 'heritage', perhaps not as a plural but as a collective noun. Heritage is thus a co-creation of past and present and is therefore open to constant negotiation, revision and appropriation. Heritage is also subject to a continuous process of inclusion, exclusion and contestation.<sup>126</sup>

For all these reasons heritage is inherently complex.<sup>127</sup> This evidently makes cultural heritage management a complex challenge as well, not only from a technical but also from social, political and cultural perspectives. Although the research for this thesis initially started from evidence-based and scientific approaches, this study takes this complex nature seriously, as will become clear throughout Chapters 2 to 8.

<sup>120</sup> See, for example, the dried-up rivers in the Dutch landscape that contain many shipwrecks from prehistoric, Roman and medieval times.

<sup>121</sup> Westerdahl 1992, 6.

<sup>122</sup> Westerdahl 1992, 5.

<sup>123</sup> ICOMOS 2002

<sup>124</sup> Deacon 2004, 31.

<sup>125</sup> Peckham 2003.

<sup>126</sup> Ashworth et al. 2007.

<sup>127</sup> Graham & Howard 2008.

In dealing with the 'overlap' between underwater cultural heritage and maritime cultural heritage (Fig. 1.23), predominantly concerning shipwrecks that are situated under water, the research pays specific and systematic attention to sites in the context of their underwater environment. This relationship with the environment is essential to understanding each individual site. The relationship between each wreck and its environment can tell us something about why the ship sank in that area, what it was doing there, why it was discovered when it was, and the reason for its current condition, not to mention possible future threats to the site and possible future accessibility. The link with the environment also adds to the overall value of the individual site. More specifically, it may also influence the value people attach to a site. Local traditions, social connections with an area and the potential or current use of a site or an area influence its historical and archaeological significance.

Shipwrecks in themselves are essentially seen as 'time capsules' and their informative strength is the assemblage value of all the associated objects: the ship itself, its inventory, personal belongings and cargo collectively.<sup>128</sup> Shipwrecks are thus seen as little 'Pompeii's'. In a way, this is true for many shipwrecks, in particular those ships which sank in a singular event. Much of the material we now find on the site is related to that one event. However, post-depositional processes may have disturbed this original pattern and may also be regarded as part of the history of the site. Taking a longer term perspective on sites creates longer and more continuous stories of the object we are investigating and preserving. This poses questions that may relate to the afterlives of specific events (of which a shipwreck may have a lot to say) or to the histories of larger areas over a longer period of time. Individual shipwrecks, for example, are also part of a larger history. Every shipwreck has its own story (or multiple stories) to tell, but is, for example, also connected and part of the history of a larger area or period. They are physically and environmentally attached to a particular former or current sea, river or lake bed and, through their common past, different sites can be historically connected as well.

When we talk about sites, individual shipwrecks, we can refer to those as resources to learn about our past. The sites we know, are known resources. These known resources can be divided into the categories of archaeological remnants in situ and the sites that have already been excavated.<sup>129</sup> The unknown resources are those of which the location, nature, age and quality have not yet been established. The quantity

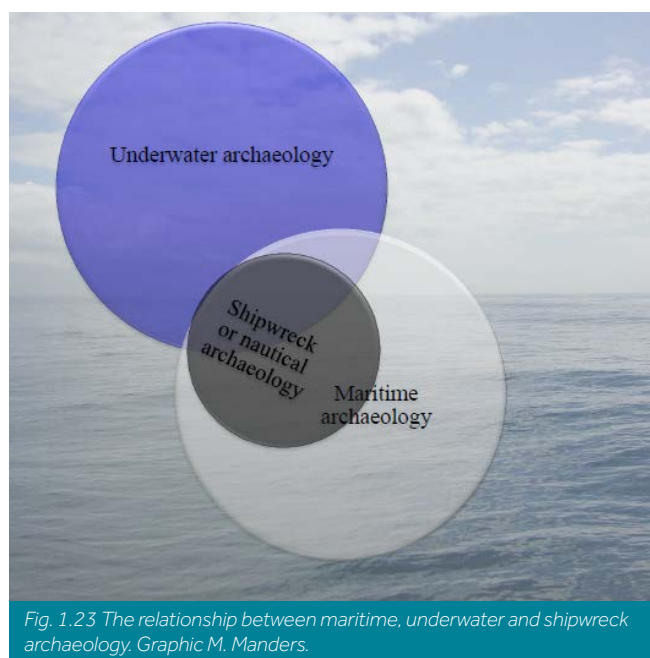


Fig. 1.23 The relationship between maritime, underwater and shipwreck archaeology. Graphic M. Manders.

and quality can only be indicated by approximation, deduced from our knowledge of the known resources. This is also the reason why these are also officially classified as 'predicted resources'.<sup>130</sup>

### 1.7.2 In-situ preservation, protection, stabilization and conservation

Throughout this thesis I will discuss in-situ preservation and in-situ protection. There are differences in the definition of these concepts.<sup>131</sup> While 'in-situ preservation' concerns an overarching approach to keeping the sites at the location where they have been discovered regardless of any physical or legal action taken, 'in-situ protection' concerns more active involvement in this process.<sup>132</sup> Protecting a site means taking action or measures to prevent further deterioration and loss. This can be done by means of artificial covering, reburial or by applying law.<sup>133</sup> Other terms that are often used in relation to protection are 'stabilization' or 'conservation'. These entail active involvement as well, but stabilization also implies that the focus is on the current condition: it does not necessarily entail improvements, only ensuring the situation does not deteriorate. Stabilization and conservation, therefore, mitigate against change, but do not initiate change, development or empowerment. One may consider this an interim action, merely to ensure the site does not deteriorate. However, ultimately, stabilization of a site may be all that is done, with no further action taken.<sup>134</sup> Conservation may be considered to be much the same as stabilization, but sug-

<sup>128</sup> See, for the Pompeii premise, Binford 1981.

<sup>129</sup> Deeben et al. 2005, 38.

<sup>130</sup> Deeben et al. 2005, 39. See also Chapter 4.

<sup>131</sup> See also Chapter 4.

<sup>132</sup> Although these are the definitions of preservation and protection that I use, opinions are not consistent throughout the literature. Often preservation is regarded

as active involvement, although practice shows otherwise. See, for example, Ortmann 2009, 14.

<sup>133</sup> See also Chapter 4.

<sup>134</sup> Conservation and stabilization require management, involving baseline study, extensive monitoring and actions such as a follow up to maintain the quality of the site. See also Maarleveld et al. 2013.





Fig. 1.24 Is in-situ preservation a panacea or wonder-pill?  
Figure: courtesy M. Manders.

gests more active involvement to consolidate or improve the situation for a longer period.

For all these reasons, I will use the term 'in-situ preservation' when talking about the overall aim of leaving sites where they have been found, whether this means leaving the sites unmonitored, applying legal methods or active conservation, or stabilization of the site. The word 'protection' will be used only when actions are described. 'Conservation' will specifically be used in

relation to improving the current situation and hopefully the condition of the site, while 'stabilization' will refer to a current situation that is being maintained.

### 1.8 Structure of the thesis

In the following chapters, the Western Wadden Sea, its cultural historical richness and all the processes, factors and actors threatening it will be dealt with separately. Chapter 2 will explore whether it is possible to gain more sound knowledge of the presence of underwater cultural heritage in the Western Wadden Sea. The chapter focuses on the richness of what has already been discovered. Through the development of a landscape approach to the archaeological heritage management of the Western Wadden Sea, and introducing the new Historical Geomorphological Map Set (HGMS), the chapter attempts to develop an understanding of the landscape and its submerged cultural heritage. The parameters that influence this landscape will be investigated and its relationship with the known and also the potential heritage will be explained. The question of how to predict the presence of still undiscovered shipwrecks in the seabed will also be answered, including how we can develop a method to create awareness of the presence of underwater cultural heritage through desk top research.



Fig. 1.25 A diver with Surface Supply Equipment (SSE) at the BZN 10 wreck. Lots of sediment is suspended in the water. Currents take and deposit the protective layer of sediment on the seabed. Photo: Paul Voorthuis, Highzone Fotografie.

The dynamics of the Western Wadden Sea pose interesting challenges for the prediction process but also act as a preserver of or aggressor towards underwater cultural heritage (Fig 1.25). Chapter 3 is dedicated to the threats to underwater cultural heritage. The known and unknown resources, particularly in the Western Wadden Sea, will be the main subject of research. The threats will be divided into mechanical, biological, chemical and human/anthropogenic threats. They are, in fact, closely associated with the changes occurring on site. Hence, the more stable a site is, the better its natural protection. Chapter 3 presents an inventory of the threats while also attempting to formulate measures to manage and mitigate against these threats. The dynamics of the seabed are dealt with specifically, as these pose a big challenge for in-situ protection.

Before we start engaging in any active involvement to mitigate against change and thus the threats, we need to ask why we want to preserve sites in situ? The reason to do this may also have implications for the way we preserve and protect a site. This will be discussed in Chapter 4.

How we can preserve sites and thus mitigate against threats, and the kind of techniques that are available will be discussed in Chapter 5. Here we will look into the questions of whether in-situ management is a panacea or magic pill for cultural heritage management, and whether it is the right solution for the rich underwater cultural resources in the Western Wadden Sea.

In Chapter 6, an important and often forgotten step in underwater cultural heritage management is discussed – the issue of monitoring. Sites that are preserved and protected in situ will be investigated over a longer period of time. The chapter will explore the duration of in-situ protection, how we know a site will further deteriorate, and what kind of equipment we need to use to monitor the sites.

We could leave sites on the seabed for future generations, or without any notion of what to do with them. However, we might also make use of their richness and the beauty. Chapter 7 will be devoted to the question of the accessibility of sites and the involvement of different stakeholders. How might we bring sites to the public and the public to the sites?

In the conclusion, presented in Chapter 8, the research questions will be answered separately. The overarching questions: *'Is in-situ preservation a viable option in the management of the underwater archaeological resource?'*; *'Is in-situ preservation a panacea for underwater cultural heritage management?'*, and, more specifically, *'Is in-situ preservation the solution for cultural heritage management in the Wadden Sea?'*, will be answered here using the data and knowledge presented in Chapters 2 to 7.