Underwater heritage in Iceland
Assessment and recommendation regarding underwater cultural heritage.

A master thesis from the Maritime Archaeology Programme, University of Southern Denmark

By

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Summary

Being an island in the middle of the North-Atlantic ocean, Iceland has always been dependent on ships. That either being for transport of important wares from other countries or for fishing. With temperamental weathers in Iceland sailing has always been dangerous and many lives have been lost at sea with ships either sinking or stranding around the Icelandic coast.

The objective of this thesis is to analyse underwater heritage management in Iceland and to make it available and understandable to both archaeologists and people without academic background in the subject. The focus will be on protection by comprehending the threats and address them without great excavations since it is the authors' opinion, supported by the 2001 Underwater Cultural Heritage Convention.

Underwater cultural heritage has been mostly ignored in Iceland up until recently. Only six projects in total have focussed on the subject and of these four have begun in the last five years. Furthermore, because of lack of legal backing and no guidelines for the National Heritage Agency, no surveying has been done in areas where work is being done that might damage underwater cultural heritage. For the National Heritage Agency to be able to effectively protect underwater cultural heritage formal guidelines must be set and surveying needs to be done in areas where underwater cultural heritage might be in danger.

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1. Introduction

Iceland was the last country in Europe to be settled, with the first settlers moving to the island at some point during the ninth century. The island was settled by nordic men and women looking for a new life in a new country.

There are written accounts of earlier visitors coming to the island before the settlements, though no evidence has been found to support those claims.[1]

The people of Iceland have always lived close to the sea, with most of the central part of the island being inhabitable and most settlements being around the coast. Although the first settlers may have been self sufficient to start with but with colder climate made the need to import corn, wood and iron.[2] This import was completely done by sea until the 20th century, where air travel became more and more available. Despite this additional option of transportation, most of Iceland's import today still travels through the country's harbours. Furthermore, for survival, Iceland has always relied heavily on fishing, first with small rowing boats, then larger sail vessels to the large industrial trawlers seen in Icelandic harbours today.

With the weathers in Iceland being very temperamental and unpredictable, Icelanders have always been respectful of the sea. The sea has both been the lifeline and the death of many men and women throughout the ages, with hardly any town around the Icelandic coast that has not got a memorial for the sailors of the town that have been lost at sea.

Archaeology has a long history in Iceland with the first archaeological group (Hið Íslenzka Fornleifafélag) founded in 1879 and

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[1] Benediktsson 1974, Pp. 155.
[2] Þórarinsson 1974, Pp. 38
Karlsson 1975, 12-17

has since printed a yearbook since 1881. Through the years archaeology has grown with more and more well educated archaeologists working in Iceland.

Land archaeology has been well documented and much of the country has been surveyed through the years.[3] This has been done to have a better understanding of cultural heritage on land as well as making heritage management more efficient. This is however not the case when it comes to underwater heritage management. This part of archaeology has almost completely been ignored in Iceland, with only a small amount of surveys and excavations done. In their article about surveying around the Westfjords of Iceland, Ragnar Edwardsson and Arnar Þór Egilsson open the article with these words:

> *"Icelandic archaeological research has mainly been focused on land based sites and submerged sites have received little or no attention. The number and condition of underwater archaeological sites is unknown and no national wreck database exists. It is likely that the underwater environment will come under increased threat because of different building projects, especially in the shallow waters close to modern day settlements. It is important that core underwater archaeological research is begun, especially surveys to assess the condition and potential of the submerged heritage in Iceland."*[4]

In these few words Mr. Edvardsson and Mr. Egilsson come to the core of the status of Icelandic underwater cultural heritage protection. In another report, written for the 2011 expedition to the Postship Phønix, same authors furthermore write: "The reasons for the lack of interest in underwater archaeology are many, for example: lack of money and the common misunderstanding that underwater cultural heritage is badly preserved around Iceland."[5]

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[3] A map of some of the areas documented can be seen at: http://www.minjastofnun.is/gagnasafn-/kortavefsja/ 10.12.2013
[4] Edvardsson and Egilsson 2011, Pp. 1
[5] Ibid, Pp. 5

1.1 Objectives

The object of this thesis is to analyse underwater heritage management in Iceland. In order to perform such task different aspects of underwater heritage management need to be explained. It could be said, that a large part of this thesis' aim is to make underwater heritage management understandable to both archaeologists and people with little or no knowledge in archaeology. The thesis is constructed in an easily readable way, while providing readers, both archaeologists and people without a background in archaeology, with a better understanding of both procedures and possibilities in underwater heritage management, especially around Iceland. The focus will be on protection by comprehending the threats and address them without great excavations since it is the authors' opinion, supported by the 2001 Underwater Cultural Heritage Convention.[6] It is furthermore the authors' point of view that surveying and mapping of the coast line of Iceland is of a greater importance than using the limited funding on expensive excavation. Therefore, excavations and excavation methods will not be discussed in this thesis.

The thesis is divided into six independent chapters, where each chapter explains different aspects of underwater heritage management.

In first chapter, the legal environment in Iceland is explained. Hence, the history of heritage protection laws in Iceland is summarised, with focus on the underwater heritage protection. In addition to that milestones in heritage protection are inspected. In the latter half of this chapter there is a short summary of underwater heritage protection in Iceland's neighbouring countries. The countries chosen are Norway, Sweden, Denmark, the Faeroe Islands and Ireland.

In the second chapter, the main international conventions that have had influence on underwater cultural heritage are briefly discussed. In addition, the chapter will touch on the international conventions that Iceland has signed and ratified.

[6] Article 2.5 Full text can be found at: http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/2001-convention/official-text/

The third chapter inspects diving in Iceland. The main objective of the chapter is to explain different aspects of diving, such as sports diving and commercial diving. To start of the chapter, the relationship between, sports divers and underwater heritage is discussed. The main object of such examination is to get a general overview over where sports divers dive and what can be done to mitigate a possible damage done by sports divers on heritage management. Second part of the chapter reviews the laws and regulations regarding commercial diving around Iceland. Finally, the last chapter explains an idea how wrecks can be left “in situ”, and how they can function as museums in themselves at the bottom of the ocean.

In the fourth chapter the research history of underwater heritage in Iceland is told. Each project gets a special section in the chapter where the project is outlined and their findings are presented.

The fifth chapter serves as a brief review of historical evidence on ship ownership and trade relations in Iceland. This chapter alone could be a project for itself, hence the object of the chapter is to tell a short history of the islands import and export, ship ownership, ship traffic around the country, and finally, information on ships lost around Iceland.

The sixth and the last chapter analyses the main methods used in underwater archaeology for surveying. First of all, geophysical methods for surveying are explained. This part of the chapter is mainly aimed at those with limited knowledge about underwater surveying, as most archaeologists that have worked with underwater archaeology are familiar with these methods, and are most likely to have applied them in their researches. In the end of the chapter predictive modelling is explained shortly. The methods used for the predictive modelling should at that point be clear, as they have been discussed in earlier chapters.

At the end of the thesis, the information gathered will be summarised with some suggestions on how they can be applied to bring underwater heritage management forward in the future.

It is the authors’ hope that after reading the thesis, everyone that has read it will have more understanding on underwater heritage

management and can see the need for more attention being spent on underwater heritage management in the future.

2. Legal Environment in Iceland and the neighbouring countries

2.1 Introduction

> *"Discussions on treasure hunting and exclusive salvage rights that are sold to salvors or historically informed entrepreneurs are easily dismissed as irrelevant"*[7]

The focus of this chapter is on laws regarding heritage management in Iceland and the nordic countries and Ireland. The chapter begins with an extraction on the history of heritage laws in Iceland from the first law of 1907 to the law approved in 2012 which came in power 1st Jan. 2013, followed by a summary of the heritage protection law from Norway, Denmark, Sweden, the Faeroe Islands and Ireland.

2.2 History of the Icelandic antiquities laws to the present day.

The first law on heritage or antiquities was made in 1907 and was called *"Lög um verndun þjóðmenja"*[8]. However to understand the need for these laws a little introduction to the history of antiquities collecting is necessary for those unfamiliar with the situation of heritage management in Iceland, therefore not knowing what the development has been through the decades. The history repeated here is by no means comprehensive, and the summing up of the laws will be very crude, with only the main objectives of the laws mentioned. Because of the nature of this project those parts of the laws and, or conventions that have to do with maritime heritage are focused on specially here, with other parts less relevant being only mentioned shortly or skipped.

The first documented collection of antiquities was done by Árni Magnússon who spent his life collecting Icelandic manuscripts from earlier ages and despite the fact that much of his collection was lost in the great fire of Copenhagen in 1728, it is highly unlikely that much of the collection would be available today.

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[7] Maarleveld, 2007. Pp. 9

[8] "Laws on the protection of antiquities"

On his death bed in 1730 he bequeathed the whole collection to the University of Copenhagen where the collection was kept for the next two centuries.[9]

It was not until the start of the 19th century that Icelandic antiquity, apart from rune stones and books, came under the searchlight again. In 1807 the predecessor of the Danish National Museum in Copenhagen was founded[10], and in 1817 the commission, as it was called at the time, sent out letters to all Icelandic priests in which these were asked to tell about all monuments or relics that they knew about. These reports are now kept at the Danish National Museum. Until the founding of the National Museum of Iceland objects of historical significance were sent to Copenhagen for research.[11]

The National Museum of Iceland was founded in 1863 when a farmer named Helgi Sigurðsson gave the Icelandic government 15 objects with the sincere wish that a museum would be founded in Iceland to protect and preserve Icelandic relics. The museum made protection of Icelandic heritage much easier since relics regarding Icelandic history did not need to be sent abroad for safe keeping[12].

As mentioned above, the first law on protecting national heritage was done in 1907, incidentally just a few months after the 100 year anniversary of the Danish National Museum. The law focused mainly on how to define antiquities and monuments according to law and how they are supposed to be dealt with.

A major part is the introduction of the 150 year rule, where every found object or building over 150 years old was considered a monument, historical building or antiquity. It was the job of the state antiquarian to define which monuments and buildings were chosen as national monuments and were thereby protected and could therefore not be changed or damaged without the express permission of the antiquarian. All smaller archaeological finds were, unless a proven owner is found,

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[9] Björnsson 2006, pp.79-80
[10] "Kongelig Commission til Oldsagers Opbevaring"
[11] Eldjárn, 2000. Pp. 11-12
[12] Ibid, Pp. 12

regarded as property of the Icelandic State and should be handed to the National Museum of Iceland for safe keeping.

Furthermore the law states that a state antiquarian shall be hired who is responsible for the National Museum and all matters relating to heritage management. That includes registration of protected sites and artefacts known as the storage of the artefacts owned by the national museum.

Finally the law covers the procedure of making sure protected heritage, artefacts, buildings and antiquities, are not damaged, destroyed or moved out of the country.[13]

The law was updated in 1947, but in 1969 new laws were passed at Alþingi[14]. The main change done to the law was that the differentiation between the words *fornminjar*[15], *fornleifar*[16] and forngripir[17] is defined. Furthermore local museums were mentioned in the law where the responsibilities of the museums were defined. Along with that churches and church artefacts were introduced to the law. Finally the protection of historic buildings was introduced. This part of the law has little or no connection with archaeology and is not of interest in the context of this thesis so they will not be mentioned further in this paper[18].

In 1989 the law was updated again and the infrastructure of the management was changed substantially. Instead of having one state antiquarian in charge of almost all archaeology and the national museum there was formed a committee that was in charge of forming future plans for the national museum and heritage management in Iceland called Þjóðminjaráð. The state antiquarian is in charge of enforcing the plans that this committee formulates. Furthermore another committee, called

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[13] Lög um verndun fornmenja nr. 40/1907
[14] The Icelandic parliament
[15] Fornminjar are any artefacts that have Icelandic origin (can also mean from other countries, but in the laws from 1969 it stands only for objects of Icelandic origin).
[16] Fornleifar are buildings, ruins and other stationary constructions of any kind made by man.
[17] Artefacts of any kind that are or have been in the earth and are not by anyones knowledge in private ownership.
[18] Þjóðminjalög nr. 521969

Fornleifanefnd is formed where three persons are responsible for reviewing applications for archaeological research in the country, and giving permits to the projects that fit the criteria of heritage management and protection.

Another change that was done to administration was dividing the country into areas where a district antiquarian is chosen by the state antiquarian to be in charge of overseeing cultural heritage in the area.

Finally the age of automatically protected objects or buildings is changed from 150 years to 100 years.[19]

In 2001 new laws were passed, where the administration of the heritage protection was changed and a complete separation was made between heritage management and the National Museum. The National Heritage Agency was founded and all district antiquarians fall under the National Heritage Agency from that moment. Finally the building protection was cut out of the national heritage law and was put into a special law of it's own. Other changes were made but those are of minor importance to this thesis[20].

In 2012 new laws were again passed and these are active from 1st Jan 2013. The largest changes on general heritage management, to name some, are time limits on artefact return to the national museum and the extent for permissions of researches as examples.

In this law, protection of underwater heritage finally gets a part in the law, where it is specifically stated that all buildings, artefacts and other constructions found in water or sea that are over 100 years old are automatically protected by law[21].

This, if enforced in the right way can change the possibilities in maritime/underwater archaeology significantly, as with the new laws there is no doubt what areas are covered under the laws and must be monitored. Further work on management directions by the National

[19] Þjóðminjalög nr. 88/1989
[20] Þjóðminjalög nr. 108/2001
[21] Lög um menningarminjar nr. 80/2012

Heritage Agency will be needed though, to ensure that the implementation will be successful. According to Dr. Kristín Huld Sigurðardóttir, director of the National Heritage Agency, this work will hopefully start in the year 2013[22]

2.2.1 Financing of archaeology in Iceland

Financing of archaeological surveying or excavations in Iceland depends largely on the nature of the research being done. According to the Antiquities law presently active in Iceland first assessment done by the National Heritage Agency is taken from the agency's budget. However if, the National Heritage Agency regards the area under danger because of for example construction, the company/person responsible for the danger is required to finance a more thorough archaeological survey[23]. If that leads to a full scale excavation is decided by the National Heritage Agency. Other surveying and excavations have mostly be founded by the government with either direct funding from the state or from government funds that support different projects Table XXX[24].

Projects funded by other means are not mentioned here because of lack of information on the subject at present by the author. These include excavations or surveys funded either private or publicly[25].

[22] Personal comment Kristín Huld Sigurðardóttir 06.12.2012
[23] Þjóðminjalög nr. 80/2012 28. gr.
[24] Numbers are from finances of the Icelandic State with added information from Félag Íslenskra Fornleifafræðinga.
[25] The largest one recently being an excavation in downtown Reykjavík

Year	Þjóðhátíðarsjóður/State financed fund	Fornleifasjóður/ State financed fund (from 2013 called Minjasjóður)	Fjárlög/ Direct state financing	Total
2007	6.500.000	25.000.000	78.000.000	109.500.000
2008	5.200.000	25.000.000	92.000.000	122.200.000
2009	2.600.000	22.000.000	63.000.000	87.600.000
2010	2.750.000	19.100.000	27.600.000	49.450.000
2011	4.800.000	17.900.000	31.900.000	49.199.000
2012	0	32.900.000	13.000.000*	45.900.000
2013	0	32.200.000	0	32.200.000

Table 2.1. Funds for archaeological research in Iceland 2007-2013. (Note all numbers are in Isk)

These do not include funding to archaeological field schools, these are estimated roughly 10.000.000 Isk

2.3 Laws in other countries

This chapter will explain the maritime part of the heritage laws and administration in Iceland's neighbouring countries. Since this thesis is only focusing on maritime/underwater heritage then this will be the only part discussed in this chapter. It will not in any way be a complete discussion of the laws and some parts that other people might find relevant might not be discussed here. That is because it would extend the research out of proportion and/or in some parts because lack of understanding in the relevant language.

2.3.1 Norway

The present Norwegian heritage law[26] has been active since 1979 with later amendments[27]. With the present law and its predecessors Norway has been a leading authority in heritage protection for years.

[26] Lov 1978-06-09 nr. 50: Lov om kulturminner (kulturminneloven)
[27] Last amendment was approved 5th june 2009

In an article from 2006, Jostein Gundersen explains how the law is meant to provide a framework for protection in the following way:

> *"According to the Norwegian heritage protection law, all public and larger private organisations are required to map all possible locations where cultural heritage could be present, and could be damaged or destroyed by the planned construction. This should be done before any construction work has started and should be done by the institution chosen by the state to do such researches."*[28]

In a maritime context, all cultural heritage as defined by the law[29] is protected and must be treated as such. However, there is a special law regarding boats and ships that are found in Norway or Norwegian waters. According to the law everything from prehistoric times and middle ages (this period is defined as everything before 1537) as are all buildings from before 1649 and sami remains 100 years back is automatically protected by law. However boats and ships are, as the sami remains, protected 100 years back at any time. This protection goes for boats, shipwrecks and accessories of the vessel, cargo and any object of any kind that has been on board the vessel.

This law does not specify if artefacts, constructions or vessels need to be on land. However according to laws on petroleum drilling and processing a contractor must, before a new area is opened up, do a survey of the area where the possibility of damaging the ecosystem or the area is supposed to be assessed from economic, environmental and social perspective.[30] According to this law the area covered is Norwegian territorial waters[31]. This law covers cultural heritage in the way that any shipwreck or other cultural artefact that might be damaged by the petroleum enterprise can be interpreted as a social damage.

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[28] Gundersen, 2007. Pp. 89. Translation by author. Original text: Den norske kulturminneloven pålegger alle offentlige og større private utbyggere å kartlegge eventuelle kulturminner som kan bli ødelagt eller på annen måte bli skadelidende ved planlagte utbygginger. Dette skal gjøres før eventuell bygning kan starte op og, skal gjennomføres av den institusjon som er delegert slike oppgaver av myndighetene.

[29] To explain all parts of that would take to long for a thesis of this size so for more information see KAP. II of the norwegian heritage protection law

[30] Lov 1996-11-29 nr 72: Lov om petroleumsvirksomhet (petroleumsloven)

[31] See Chapter 3.1

The maritime heritage protection is upheld by five museums. These museums uphold the administration of applications for any activities that can damage the seafloor and anything on it, as well as administering surveys and excavations in the relevant areas. The museums are Norsk Maritimt Museum, in charge of 10 *fylke* from the Swedish border to the river Sira, Stavanger Maritime Museum, in charge of the area inside Rogaland *fylke*, Bergens Sjøfartsmuseum, in charge of the area in Hordaland, Sogn og Fjordane og Sunnmøre, NTNU Vitenskapsmuseet, in charge of the area from Vestnes kommune in the south and Rana kommune in the north and Tromsø Museum, that covers the area from Rana kommune to the Russian border.[32]

2.3.2 Denmark

The present heritage law[33] in Denmark has been active since 2001 with later amendments[34].

Maritime heritage has a special chapter in the law where all antiquities, shipwrecks, cargo from shipwrecks and other parts of wrecks that were wrecked more than 100 years ago, in rivers, lakes, Danish waters or on the continental shelf up to 24 nautical miles, with 12 nautical miles territorial water and 12 nautical mile contiguous zone[35], are protected and are state property. Furthermore, any antiquities, shipwrecks, cargo from shipwrecks and other parts of wrecks that were wrecked more than 100 years ago in international waters found by a Danish citizen or by a vessel registered in Denmark is protected by Danish law and belongs to the Danish state, if no other state or person can prove a rightful ownership over the find. All properties from sites mentioned above covered by this part of the law, if lifted from the water, are to be delivered to the rightful authorities in Denmark.

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[32] For more information see the homepages of the museums: http://www.marmuseum.no/no/arkeologi/kulturminneforvaltning/ http://www.museumstavanger.no/museene/stavanger-maritime-museum/marinarkeologi/, http://uit.no/tmu http://www.ntnu.no/vitenskapsmuseet/kulturminner-under-vann1 http://www.bsj.uib.no/om_museet/Marinarkeologi.htm.

[33] Lov nr. 473 af 7. Juni 2001, museumsloven med ædringer.

[34] Latest amendment 23rd Dec. 2012

[35] See section 3.1

Furthermore, the Minister of culture can decide that any shipwreck or remains from the past can be put on the list of protected heritage if he/she finds it fitting, even though the piece has not been in the water for more than 100 years.

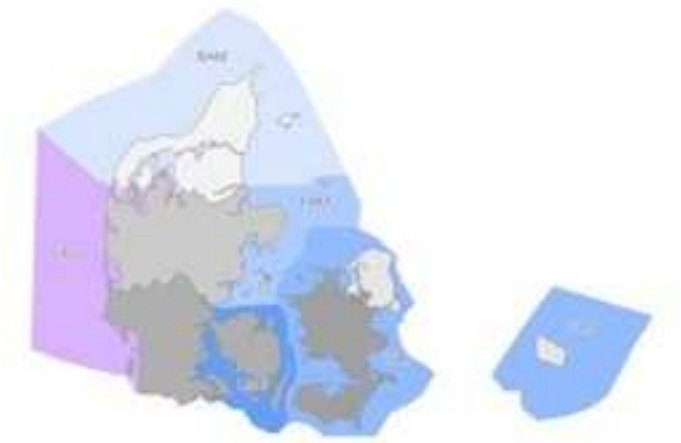

Fig 2.1 Map of areas of responsibility in Denmark

As in Norway the responsibilities for maritime heritage is divided between museums. In Denmark there are five museums responsible, Vikingeskibsmuseet in Roskilde, in charge of the coast line around Zealand, Øhavsmuseet in Rudkøbing, in charge of the coast line around Funen and the east coast of Jutland up to Vejle fjord, Moesgård Museum, in charge of the area from Vejle Fjord in the south to Ajstrup Bugt in the north, Nordjyllands Kystmuseum in Bangsbo, Frederikshavn, in charge of the area from Ajstrup Bugt in the east to Thyborøn in the west and Strandingsmuseet Sct. George in Thorsminde from Thybøron in the north to the German border in the south.

2.3.3 Sweden

The present heritage law [36] in Sweden has been active since 1988 with later amendments[37].

According to the Swedish law, all shipwrecks where the wrecking or sinking of the vessel happened over 100 years ago are protected by the law as national monuments. It is not stated specifically where those wrecks need to be positioned, but it must be concluded that these must be positioned in Swedish territorial waters according to the Law of the Sea Convention[38].

36 Lag (1988:950) om kulturminnen
37 Last amendment was approved 2013.
38 See section 3.1

Any construction of any kind, either on land or in any body of water, must be reported to the National Heritage Board[39] or the County Administrative Board[40] before any action is taken where damages could be done on any national heritage.

Any shipwreck or artefact found or lifted of the seabed outside of national jurisdiction is property of the Swedish state and must be handed in or reported to the rightful agency. According to the law, the find has to be reported if there is a possibility of the wreck sinking or stranding over 100 years ago.

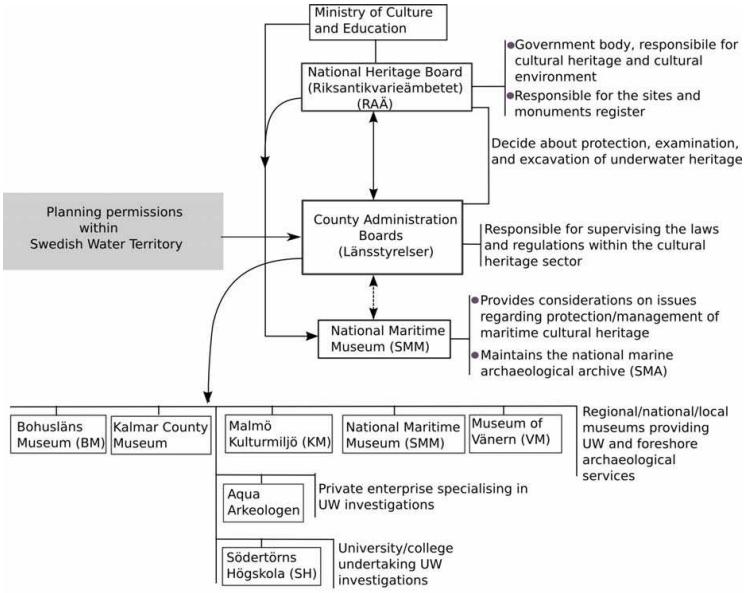

Fig. 2.2 Flowchart of the Swedish system of heritage management

The responsibility for cultural heritage management is at the County Administrative Board, one for each of the 21 counties in Sweden, on behalf of the National Heritage Board. The work, however is conducted by museums and private companies approved by the individual County Administrative Boards[41]. At the moment there are five museums and companies active in the field of underwater archaeology. These are Bohusläns Museum (county museum), Malmö museer (city museum), Kalmar Läns Museum (county museum), Sjöhistoriska Museet (National Maritime Museum) and AquaArkeologen (private company)[42].

2.3.4 Faeroe Islands

The Faeroe Islands didn't have a special law protecting shipwrecks around the islands until 2004, when a special law was voted in by the

[39] Riksantikvarieämbetet
[40] Länsstyrelsen
[41] Bengtsson, 2008. Pp. 7-8. Borssén, 2008. Pp. 10
[42] Pers comm. Staffan Arbin 25.10.2012

Faroese parliament[43]. The law specifically focuses on all cultural heritage underwater[44]. It specifies that all finds of archaeological, cultural or historical nature, fx. Ship, boat, aircraft, cargo or part of these that were lost over 100 years ago are covered by the law as cultural heritage. The protected area is 12 nautical miles territorial water plus a 12 mile contiguous zone as described in the Law Of the Sea Convention. Any cultural heritage found within the area shall be reported to the Faroese National Museum.

If a vessel registered in the Faeroe Islands or a Faroese citizen finds or lifts cultural heritage described above from international waters, that item must be reported or handed in to the Faroese National Museum, if previous ownership cannot be proven.

The responsibility of maritime archaeology in the Faeroe Islands is in the hands of the Faroese National Museum.

2.3.5 Ireland

Ireland has a very detailed and concise legislation on underwater heritage protection. The active legislation at the moment is the National Monuments (Amendment) Act, 1987 and 1994, where the parameters of protection are stated.

According to the National Monuments (Amendment) Acts of 1987 and 1994, which are the presently active laws on heritage protection management and protection in Ireland, Wrecks and archaeological objects over 100 years old that are found underwater are protected from any disturbance without permission. Wrecks younger than 100 years old can be protected by Underwater Heritage Order (UHO) because of their historical, archaeological or artistic importance. UHO's can also be used to protect areas on the seabed from disturbance to protect wreck sites and archaeological objects scattered around wreck sites. Furthermore all diving on known protected sites is forbidden without the right permissions from the proper authorities.[45]

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[43] Arge, 2007, Pp. 55
[44] Løgtingsóg Nr. 92 Frá 21. Desember 2004 um vernd av fornlutum í havinum
[45] http://www.archaeology.ie/UnderwaterArchaeology/

The responsibilities for maritime archaeology are in the hands of The Underwater Archaeology Unit. The unit has been working since 1997 as the Maritime Survey Unit, it became The Underwater Archaeology Unit in 2000. Originally the purpose was to survey shipwreck heritage in Ireland, but with the change to The Underwater Archaeology Unit the objectives of the group changed as well. Now it manages and surveys the maritime heritage of the coast of Ireland as well as conducting excavations where they are required.

2.4 Discussion

Icelandic laws on heritage protection have changed greatly since they were originally introduced in 1907. The management aspect of the laws has been the part most greatly discussed and disputed in later times since most archaeologists and public in Iceland seem to agree that a strong legislation protecting the Icelandic heritage is important even though the exact way of doing it can be discussed heavily.[46]

Icelandic heritage law resembles that of the neighbouring countries in many ways though some parts differ. One great difference that can be seen between Iceland and Sweden on one hand and Norway and Denmark on the other, is the commercial aspect that can be seen in Iceland and Sweden. The aspect of which way is more effective and gives better protection for cultural heritage has been discussed widely, fx. in some of the articles mentioned above and in international forums.[47] A vital part of this difference is the part that the state holds out a team of archaeologists specialised in underwater archaeology, where the team has

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[46] Discussion on a report done for the ministry of culture on management of heritage management and archaeological research is a good example of disagreements archaeologists in Iceland face today.
Examples are:
http://www.mbl.is/media/40/6340.pdf 11.12.2013
http://fornleifur.blog.is/blog/fornleifur/entry/1300533/ 11.12.2013
http://www.visir.is/telur-fornleifaskyrslu-aerumeidandi/article/2013705289905 11.12.2013
http://www.mbl.is/frettir/innlent/2013/06/05/ekkert_samrad_ovidunandi/ 11.12.2013
Birgisdóttir 2013

[47] Fx. Majewski and Gaimster 2009, pp. 25-26

both the equipment and manpower to take on underwater surveying and excavation, as can be seen in Norway, Denmark and Ireland.

Another aspect where the laws differentiate is the age where wrecks and other objects are protected automatically by law. Iceland follows the trend of Denmark, Sweden and Ireland with the 100 year rule, even though Sweden will follow Norway with a change of laws that enter into force 1st feb. 2014 where wrecks wrecked later than 1850 are no longer protected automatically by the law. This will bring danger of damage because of construction and even treasure hunting in and around wrecks formerly protected by the law.

That underwater cultural heritage is mentioned in the newest version of the Icelandic law is a huge step to make underwater heritage protection in Iceland more effective. This puts more responsibility on the local antiquarian to conduct surveying in areas possibly affected by construction or other aspects that might danger cultural heritage in the area.

As has been mentioned in the introduction to this thesis parts of it will introduce the reader to the different methods that can be used to predict and survey where underwater cultural heritage can be found and will need attention. However, with less and less money available in Icelandic archaeology[48], the prospects of underwater cultural heritage protection in Iceland do not look bright for the future, even though the legal environment is on the right track.

[48] See table 2.1. More on 2014 finances can be seen at:
http://www.mbl.is/frettir/innlent/2013/10/09/afar_uggandi_yfir_throun_mala/ 11.12.2013
http://www.ruv.is/frett/ottast-ad-40-arsverk-tapist 11.12.2013

3 International conventions

3.1 Introduction

"Who owns the sea?"

That is a question that has been discussed for centuries. In his book De Jure Belli Ac Pacis from 1625, Hugo Grotius mentions the ownership of the sea and coastal areas. He argues that the sea is no mans property and is "open and free for all"[49]. However, on the same pages, he argues that the shores are owned by the state[50]. Cornelis van Bijnkershoek took the argument a step further and his statement "terrae potestas finitur ubi finitur armorum vis[51]" was recognised as the rule for territorial waters until The United Nations Convention on the Law of the Sea (UNCLOS) was developed and ratified by most countries in the world[52]. The law states that "breadth of its territorial sea up to a limit not exceeding 12 nautical miles"[53] determined "breadth of the territorial sea is the low-water line along the coast as marked on large-scale charts officially recognised by the coastal State"[54]. Furthermore a state can exercise control over a further 12 nautical mile zone called contiguous zone[55]

International conventions and recommendations on heritage management have been developed under the supervision of UNESCO for almost 60 years where much has been achieved. These do however fall short in some cases as in some cases even countries that have been part of the drafting process have not ratified those conventions.

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[49] Grotius, 2005. Pp. 461
[50] Ibid, 2005, Pp. 461-463
[51] Translates roughly: the power of the earth comes to an end where the force of arms comes to an end, meaning that the limit should be set at the range of shore batteries, or roughly 3 miles. See: Oppenheim, 2005. Pp. 335
[52] For more info see: http://www.un.org/Depts/los/reference_files/status2010.pdf 09.11.2013
http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm 09.11.2013
[53] Section 2, article 3.
[54] Section 2, article 5.
[55] Section 4, article 33.

These conventions and recommendations and Iceland's ratification of those is discussed in this chapter.

3.2 UNESCO and Council of Europe

On the subject of heritage protection UNESCO has been a leading authority in raising awareness with its conventions and recommendations. Furthermore the Council of Europe has adopted conventions on maritime heritage. The most important conventions to maritime heritage will be discussed shortly below.

- The "Hague Convention" 1954. Introduces the "Blue Shield" for monuments and buildings with cultural importance for the nation. Mentions furthermore that any damage done to cultural heritage damages the cultural heritage of the whole world.[56]

- The "New Delhi Recommendation" 1956. Focuses on the responsibility of any country for cultural heritage inside it's borders. The authorities must take care that any excavation is conducted in a responsible way with proper care taken of find assemblies and documentations. It furthermore focuses on the proper protection from treasure hunting and illicit trade of archaeological finds.[57]

- The "European Convention on the Protection of the Archaeological Heritage" 1969. It did not make a significant difference on maritime heritage protection but did wake up discussions later on for more defined policies in heritage management[58].[59]

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[56] For the full text of the convention see: http://portal.unesco.org/en/ev.php-URL_ID=13637&URL_DO=DO_TOPIC&URL_SECTION=201.html 09.02.2013
[57] For the full text of the recommendation see: http://portal.unesco.org/en/ev.php-URL_ID=13062&URL_DO=DO_TOPIC&URL_SECTION=201.html 09.02.2013
[58] Maarleveld, 2007 Pp. 22
[59] For the full text of the convention see: http://conventions.coe.int/Treaty/en/Treaties/Html/143.htm 10.02.2013

- The "Convention with the long name" 1970. The real name is "the UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property", but generally (and rightfully) known as the Convention with the long name". The name of the convention is very self explanatory as the convention more or less replaces the 1956 recommendation with a more secure "legal" document. It is now supplemented by the UNIDROIT Convention on Stolen or Illegally Exported Cultural Heritage from 1995.[60][61]

- The "World heritage convention" 1972. Introduces the World heritage list. Focuses further on the one heritage for the whole world concept.[62]

- "Recommendation 848" 1978. Focussed on the importance of states protecting underwater cultural heritage in their respective "protective zones". The idea of the recommendation was that states would have a 200 miles protection zone, where possible, and inside that area they would protect the maritime cultural heritage. The recommendation was more or less cancelled out by the Law of the Sea Convention. It furthermore recommended to draft a European convention on underwater cultural heritage which was finished in 1985. This part of the recommendation was however never finished properly.[63]

- The "Valletta Convention" 1992. One of the best known conventions concerning cultural heritage protection. One of the most important factors of the convention is the factor that the cost of surveys and excavations should be an integrated part of

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[60] For the full text of the UNESCO convention see: http://portal.unesco.org/en/ev.php-URL_ID=13039&URL_DO=DO_TOPIC&URL_SECTION=201.html 10.02.2013
[61] For the full text of the UNIDROIT convention see: http://www.unidroit.org/english/conventions/1995culturalproperty/1995culturalproperty-e.pdf 10.02.2013
[62] For the full text of the convention see: http://portal.unesco.org/en/ev.php-URL_ID=13055&URL_DO=DO_TOPIC&URL_SECTION=201.html 10.02.2013
[63] For the full text of the recommendation see: http://assembly.coe.int/Main.asp?link=/Documents/AdoptedText/ta78/EREC848.htm 10.02.2013

the planning process of developments. Furthermore it stresses the importance of states having a process where accidental finds of cultural heritage will be dealt with in a responsible manner.[64]

- The "Underwater Convention" 2001. One of the most important conventions for maritime cultural heritage. Outlines the importance of maritime cultural heritage protection and the responsibility of member states in heritage management. It defines what is maritime cultural heritage. Prohibits salvage operations and encourages the member states to prevent salvage operations.

The Annex of the convention is one of the most important aspects of the convention. It lays down ground rules for activities directed at underwater cultural heritage. At the convention in 2001 all states present, including voting against it accepted to live up to the standards of the Annex[65].[66]

3.3 Iceland and international conventions

Iceland has, as mentioned above in chapter 2, tried to follow with other countries in the western world in keeping the current legal environment for heritage management updated. Some people, among them archaeologists have not always been happy with the decisions taken by the politicians when making new laws or the decisions the National Heritage Agency takes[67]. This has been seen by resolutions sent out by the archaeologists professional associations in the last few years[68]. If this criticism is rightful or not is not up to discussion in this paper,

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[64] For the full text of the convention see: http://conventions.coe.int/Treaty/en/Treaties/Html/143.htm 10.02.2013
[65] Maarleveld, 2007. Pp. 21
[66] For the full text of the convention see: http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/2001-convention/official-text/ 10.02.2013
[67] Personal comments the author has observed, both through emails between archaeologists in Iceland and personal conversations with other archaeologists in Iceland.
[68] An example of resolutions can be seen on the associations homepages: http://fornleifafelag.org/?p=616 27th Feb. 2013 and http://ffi.blog.is/blog/ffi/entry/1216208/ 27th Feb. 2013

but have been great changes in the legal and administrative environment in the last 10-15 years.

Iceland has signed three of the conventions mentioned above, the "European Convention on the Protection of the Archaeological Heritage" from 1969, the "World Heritage Convention" from 1972 and the "Valletta Convention" from 1992[69]. In the process of researching for this paper an interview was taken with the former Minister of education, science and culture, Mrs. Katrín Jakobsdóttir in Iceland in December 2012. According to the minister and Ragnheiður Helga Þórarinsdóttir, advisor for the ministry in matters regarding to cultural heritage, it was on the to do list for Iceland to ratify and sign the 2001 "Underwater Convention".[70] However, in a letter from November 2013, Mrs. Þórainsdóttir explains that after scrutinising the convention Iceland has no plans of ratifying the convention because of apparent clashes with the law of the sea convention.[71] There Iceland joins countries like Norway, Germany, the Netherlands and the UK, to name some, that have not ratified the convention because of this.[72]

3.4 Discussion

Underwater cultural heritage is clearly becoming a bigger part of the heritage management discussion. With the oceans opening up for the human being, and areas that were a complete mystery can now be accessed either by divers, or in specialised submarines, cultural heritage that was previously shielded from human intervention is now available for those with means and knowledge to access it. Treasure hunters have been roaming the waters looking for wrecks or settlements where valuable objects can be extracted, often without any regard to the history that lies in the site[73]. The build up to the present state in international

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[69] Iceland signed the original 1992 convention but never signed the 1995 revision. http://www.minjastofnun.is/um-stofnunina/log-og-samthykktir/althjodlegar-samthykktir-og-sattmalar/ 04.12.2013

[70] Pers. Comment Katrín Jakobsdóttir and Ragnheiður Helga Þórarinsdóttir 19.12.2012

[71] Pers. Comment Ragnheiður Helga Þórarinsdóttir 14.11.2013

[72] Domgoole 2013, pp. 289-290

[73] Zorich 2009 http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CLT/pdf/UCH%20Commercial%20Exploitation%20versus%20Protection.pdf 29.11-2013

law and conventions was long and was finalised with the 2001 "Underwater Convention". There underwater cultural heritage protection defined with the stated preference that protection should be "in situ". On UNESCO's homepage it is worded as: "Preservation as first option - The preservation of underwater cultural heritage (i.e. in it's original location) should be considered as the fist option before allowing or engaging in any activities."[74] This inevitably puts pressure on states parties that these sites are protected, not only from unnecessary removal of artefacts or other disturbance by professionals, but also protection from unwanted dive enterprise. As mentioned in chapter 4 below divers have been known to strip wrecks of valuable objects, not necessarily for monetary gain, but often just to have a trophy from the dive.[75]

Iceland, as mentioned above, has not, and does not plan to ratify the 2001 "underwater convention" because of the apparent clashes with the law of the sea convention. This does however not free Iceland from obligations that the country has regarding other conventions, namely the "Valeta" convention. Regarding the part of the convention of dealing with cultural heritage Iceland has not dealt with underwater cultural heritage in a responsible manner. As part of the research, a man working on a barge deepening harbours around Iceland told the author that he remembered at least one incidence of "timbers looking like from an old ship" being taken out of the water with the excavator in the harbour of Skagaströnd, an old trading harbour in the north of Iceland.[76]

[74] http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/2001-convention/ 29.11.2013
[75] As can be seen in most clubhouses of dive clubs, with ship bells, shoes and other items covering walls and shelves there.
[76] Personal comment. Guðjón Frímannsson. Dec. 2012

4 Diving in Iceland

4.1 Introduction

Sports diving has been a popular sport in Iceland for a number of years. The largest and most active sports diving club is *Sportkafarafélag Íslands* which has around 100 active members as of 2010[77]. With growing interest in diving, more thought needs to be put into heritage management so wrecks in Iceland do not end as number of wrecks in other countries, where souvenirs are taken by divers as trophies to show from the tour.[78]

In this chapter different aspects of diving are discussed with the focus of wreck diving and heritage management. Different aspects of diving, such as sports diving and commercial diving are outlined together with a description of the laws and regulations connected to diving. Finally, a short discussion on wrecks as museums will be outlined as an example of how divers can experience underwater cultural heritage in situ.

4.2 Sports divers and underwater heritage

Wreck diving is not an unknown part of the diving culture in Iceland. However, it has not been the focus for the main sports diving club. When talking to divers at "*Sportkafarafélag Íslands*" most of the divers mainly dive in areas that have beautiful fauna and fish life. A map has been made on google maps with the most notable dive spots in Iceland[79]. There some wrecks are pointed out. However, only one of the wrecks on the list is protected because of age. That is the sail ship Standard which sank just outside of Akureyri in 1917. According to the authors information this is also the only timber ship on the list.

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[77] Ólafsdóttir, 2010, Pp. 9.
[78] Information on wreck divers can fx. be found in: Kurson 2004
[79] https://maps.google.com/maps/ms?msid=205334389293000738940.00047232169b17a8a64e0&msa=0 22.11.2013

Furthermore, there is a facebook group called "flakamenn" or "wreck-men", where the purpose of the group is described as:

> *"Men of wrecks is a group about wrecks that are Icelandic or have been lost around Iceland. Here can people get the possibility to talk about wrecks and relay information about them"*[80]

In this Facebook group, number of wrecks, both where the position is known and unknown, are mentioned. According to the discussions on the page, no exact wreck register is presently available in Iceland, at least not publicly[81].

Most of the people active on that page are divers that are interested in seeing the wrecks and enjoying them as they are. However, it seems that some of the people are interested in trophies and cannot see how scavenging of the wrecks destroys both the experience for other divers and the historical significance of the wreck. This is apparent from discussion about the removal of a gun from the wreck El Grillo. There a sports diver has removed one of the guns without permission and after discovery the gun was removed from his possession. Since the gun has not been treated properly the deterioration has been faster than it would have been under water and the wreck has lost part of the attraction value. The diver has furthermore tried, with the help of a lawyer, to get possession of the gun after it had been taken by the police, he however did not succeed. The reason in this regard was not protection of

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[80] https://www.facebook.com/groups/349045898507592/members/ 05.02.2013 "Flakamenn er samskipta hópur um flök sem eru Íslensk eða hafa farist á íslands miðum. Hér gefst fólki tækifæri á að spjalla um flök og setja inn upplýsingar af þeim".

[81] Pers. comment Kristín Huld Sigurðardóttir. 06.12.2012

underwater heritage but the undisputed ownership by the Icelandic state of the wreck and all it's parts[82].

Even though some scavenging has been done, divers are first and foremost an excellent source of information about shipwrecks around Iceland. They seem to be mostly interested in ships that have sunk in the last century or so, and not many, if any, wooden ships are recorded on the page. The reason behind that could be the common misunderstanding that wood is badly preserved underwater.

Much could be done regarding sports diving and archaeology. These two can certainly come hand in hand and with more cooperation between sports divers and maritime archaeologists, the knowledge the divers have can help the development of underwater archaeology significantly. This has been done in Denmark for example where the national sports divers association (Dansk sportsdykker forbund) has educational seminars about underwater archaeology and underwater heritage management[83].

It is the duty of Icelandic archaeologists and the Icelandic National Heritage agency to educate the divers, and in that the two have failed miserably. Most divers that were talked to in the process of preparing this paper had either never been told about the laws on heritage management or did not know what the laws meant exactly for them as divers. This becomes even more of a problem since nothing has been done in educating the sports divers about the new heritage management laws taking effect in the opening of 2013.

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[82] A reference to the police diary about the removal of the gun from the divers posession dated 01.07.2001
Letters between The District Commissioners office in Seyðisfjörður and Karl Axelsson Attorney dated 03.07.2001, 04.07.2001, 05.07.2001, 09.07.2001, 11.07.2001, 12.07.2001.
Letters between Karl Axelsson Attorney and The Ministry for the Environment and National Resources 12.07.2001, 17.07.2001
Letter from Olíufélagið hf and the Ministry for the Environment and National Resources 22.03.2001
Letter from the British Legation, Reykjavík to The Ministry for Foreign Affairs 24.04.1945
Letter of change of ownership from The Ministry of Finance 8th January 1952.
Letter from The District Commissioners office in Seyðisfjörður to Eiríkur Ingi Jóhannsson 28.02.2002
Letter to the Icelandic State Prosecutions office from Eiríkur Ingi Jóhannsson 26th March 2002 and answer 04.06.2002.

[83] http://www.sportsdykning.dk/page.php?id=33 10.02.2013

To protect the wrecks around Iceland, people that are searching for and diving on the wrecks around the country must know what they are allowed to do and what not, and to show how enjoying wrecks under the pretences of "leave only bubbles and take nothing but photographs" principles can both make future visits for themselves and for other visitors more enjoyable. If not wrecks can become, if not already thought of as, a treasure trove of personal memorabilia for the first divers on the wrecks as can be seen on the wreck SS Andrea Doria, which has almost completely been stripped of all loose objects in the roughly 65 years passed since it's sinking.[84]

4.3 Laws and regulations on diving in Iceland

According to Icelandic laws[85] archaeological surveying and excavation should fall under commercial diving operations of the Icelandic dive laws and regulations. This puts a greater responsibility for the divers and dive supervisors regarding planning and security. Diving is a rather safe most of the times (see table 5.1)[86] though dive injuries tend to be more serious than the other sports counted in the table[87]. However, much of the safety is in the hands of both the diver, dive supervisor and dive entrepreneur by using the proper equipment and following the appropriate dive procedures for the circumstances.

This chapter will focus on the laws and regulations related to commercial diving in Iceland. The chapter will be split into three parts where the first part will be on the laws that are active on diving at the time of the writing, the second part will be on the regulation on diving at the time of the writing and the third part will sum up shortly how these laws could affect archaeological surveying and excavations. This chapter will not specify everything stated in the law and regulations, only the parts that the author deems related to archaeological surveys or excavations.

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[84] Kurson 2005, Pp. 8, 90-91.
[85] See above in chapter 2.2
[86] Brylske 1999, Pp. 10
[87] Ólafsdóttir, 2010, Pp.11, Brylske, 1999, Pp. 10

Sport	Number of Participants	Reported Injuries	Incident index
Bicycling	71.900.000	566.676	0,788
Roller Skating	40.600.000	162.307	0,399
Tennis	11.500.000	23.550	0,204
Fishing	45.600.000	76.828	0,168
Golf	23.100.000	36.480	0,158
Swimming	60.200.000	93.206	0,154
Water skiing	7.400.000	9.854	0,133
Scuba diving	1.000.000	935	0,094

Table 5.1 Occurance of injuries in sports in 1996.

4.4.1 Laws on diving

According to laws on diving[88] that no one can be part of an commercial diving operation without a Icelandic commercial diving ticket or a commercial diving ticket approved by the Icelandic Maritime Administration. Commercial diving operations are any dive operations that are part of the divers work or any person working on the dive operation on land. Furthermore, any diving operation that is part of organised service operation in public service is regarded as a commercial diving operation[89].

Dive equipment must be approved by the Icelandic Maritime Administration to be allowed for diving in Iceland[90].

Any accidents that happen during diving must be reported to the police in the jurisdiction where the accident happened[91].

[88] Lög um köfun nr.31/1996
[89] Ibid. 2. gr.
[90] Ibid. 5. gr.
[91] Ibid. 7. gr.

4.4.2 Regulations on diving

Regulations on dive equipment, dive tickets, dive logs, dive planning and other parts of dive administration are to be issued by the appropriate minister and the laws and regulations are to be monitored and administered by the Icelandic Maritime Administration[92].

The regulation on diving is from 2001 with amendment on tourist dive tours qualifications from 2012[93].

The regulation specifies the qualifications divers must have to be qualified to do commercial diving tasks in any body of water in Icelandic territory or from Icelandic vessels[94].

The regulation furthermore states that for every commercial dive operation there must be a single person who is stated as a dive entrepreneur and for every dive there must be one person named as dive supervisor, the regulation furthermore informs on the qualifications these persons should hold[95].

The regulation states the required safety procedures each person that is part of the dive operation must fulfil at a dive site.

In the appendix of the regulation many of the operations requirements are detailed further. It states the time a diver may work pr. day and how long resting period is required pr. day and week.

The appendix furthermore states the minimum manpower for commercial dive operations according to the nature of the operation. According to the appendix minimum of three qualified divers must be present when the dive is up to 10 meters with SCUBA dive equipment, that is a dive supervisor, diver and a safety diver[96].

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[92] Ibid. 6. gr.
[93] Reglugerð um köfun 0535/2001 and 0762/2012
[94] Reglugerð um köfun 0535/2001 Chapter III
[95] Ibid Chapter VI and VII
[96] The qualifications for the different jobs is explained in regulation 0535/2001 appendix chapter VI

With dives up to 30 meters depth with either SCUBA equipment or surface supply four divers must be present at all times, that is Dive supervisor, diver, safety diver with SCUBA equipment and a tender for the main diver.

For dives up to 50 meters only surface supply is allowed and five divers must be present at all times, that is dive supervisor, diver, safety diver with surface supply, tender for the diver and tender for the safety diver.

These personnel are the minimum for dive operations, they are not allowed to do other jobs while the diver is in the water, so for other duties such as refilling cylinders or to operate machinery on the site other personnel is needed.

The regulation goes into further details about decompression stops, access to decompression chambers and other technical details about equipment and diving that are not related to the subject here.

4.4.3 Dive regulations for archaeology

> *"We have offered these courses to other archaeologists, who even thought they do not pursue a solely underwater career, understand the discipline and integrate the findings of their "wet" colleagues into their work-for indeed they have learned, as have we, that regardless of the environment you work in, archaeology is archaeology, and underwater sites have a unique potential to offer significant information."*[97]

Since diving has not been part of the normal commercial archaeology in Iceland until recently it may be that many don't see the necessity of commercial divers performing the jobs underwater.

However as can be seen on underwater excavations in other countries in the course of a excavation a great number of dives are conducted in

[97] Delgado, 2000. Pp. 11

relatively short period of time, with great stress on the divers and the equipment, which stresses the requirements for proper equipment and qualifications of the divers (table 5.1)[98]. In these cases the same equipment is used for most of the dives to minimise the equipment on board the boat and to make sure every diver knows all the equipment, making repairs and other maintenance easier.

Furthermore as can be seen in the excavation reports from the Maritime Archaeology Program of the University of Southern Denmark much of the work done by archaeologists under water is work where normal SCUBA sports diving tickets are not qualified. These include for example the use of dredges and lifting bags as can be seen in the 2012 excavation report[99].

Excavation, year	Number of days	Number of dives	Bottom time (minutes)
Ostsee Bereich V, Darss, FPL 17. 2009	17	102	9039
Prinsessan Hedvig Sophia, 2010	14	205	12215
Prinsessan Hedvig Sophia, 2011	14	203	12571

Table 4.1 Dive times at different excavations done by the Maritime Archaeology Programme at the University of Southern Denmark.

Important part of the dive operations is doing risk assessments for the whole operation. By doing a proper risk assessment risks of injury can be mitigated substantially and by proper introduction of the assessment to the participants of the operation can furthermore be

[98] Auer 2010, Pp. 6
Auer 2011, Pp. 10
Auer and Schweitzer 2012, Pp. 11
[99] Auer and Schweitzer 2012, Pp. 11

essential in emergency situations. Finally knowledge in first aid and dive physiology, that is required to become a commercial diver in Iceland[100] and in most other European countries[101], is essential for the safety of the divers and people engaged in the dive operations.

4.5 Wrecks as museums

It is commonly known that ships have been scuttled in the sea when there is not any use for them any more. There is knowledge of a few ships around Iceland that have been sunk, though there were no rules about the monitoring of these until 1972[102]. There is good chance that these have been sunk at sufficient depth so that ships fishing in the areas in the future will not have their nets getting stuck on the wreck.

An extensive research of historical data, and surveying of the coast line of Iceland might however yield information about ships either sunk around the country after they have been decommissioned or if they have wrecked or sunk. With the proper information these wrecks could become popular dive spots for both Icelandic divers as well as an interesting travel spot for divers traveling to Iceland.

Museums under the sea have been done before. Either with posting information about the wrecks on home pages as can be seen with Sjöhistoriska museum in Stockholm. Thereby wrecks in the area covered by the museum are listed on the homepage with information about the wreck, when it was built, when it sank etc.[103] Another example of this is from the Florida Department of State, Division of Historical Resources where they have made Florida's "museums in the sea" project. There 11 shipwrecks that lie around the Florida peninsula are listed. There you can take an underwater tour, where video has been taken of the wrecks and the video tours that are available with a commentator telling about both the ship when she was in use and the state the wreck is in

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[100] Regulation 0535/2001 Appendix II
[101] European Divin Technology Committee 2003, Chapter 4.2
[102] http://www.mbl.is/greinasafn/grein/707709/?item_num=192&dags=2003-01-09 13.02.2013
[103] http://www.sjohistoriska.se/en/Cultural-heritage/Marine-archaeology/Wrecks-in-the-Baltic-Sea/ 18.02.2013

presently. Furthermore a short historical overview and a dive guide can be found on the homepage[104]

These are only two examples of using the internet as a medium to teach divers about the wrecks they are diving on. This medium can also be used to educate them further in how they can help with heritage protection by treating the wrecks according to laws.

4.6 Discussion

No official wreck database can be found in Iceland as it is. According to Mrs. Sigurðardóttir, the state antiquarian in Iceland there is will to do that, if money can be found to start the project. According to people the Icelandic Coast Guard has some kind of wreck directory but while writing this thesis the author of the thesis has tried to contact the Coast Guard no answers came back from them.

A complete database of both wrecks and other underwater heritage sites would be great help in heritage management, as these places could be monitored and even made into sites for where tourists could go for diving with certified dive guides.

Furthermore more co-operation should be done with sports divers. More public knowledge about the risks of damage to sites could mitigate the chance of divers unknowingly damaging heritage sites. UNESCO has made a training manual for people working in heritage management in Asia and the Pacific where different aspects of heritage management are explained.[105] There one chapter is completely focussed on public archaeology. In that chapter different aspects of public archaeology is discussed, fx. public awareness and public participation.[106] The manual offers different solutions to educate the divers. Examples are underwater heritage trails (very similar to the wrecks as museums concept), to teach low impact diving and to teach how to anchor around wrecks without damaging them.[107]

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[104] http://www.museumsinthesea.com/ 18.02.2013
[105] Manders and Underwood, 2012.
[106] Manders et.al. 2012, pp. 1-39
[107] Ibid. pp. 22

5 Research history

5.1 Introduction

The focus of Icelandic archaeologists has not been much underwater. Out of 599 licences for archaeological research in the years 1990-2010[108] only 4 projects have been underwater. When doing research for this project the author had discussions with a few archaeologists in Iceland about underwater heritage management, and found out that in most cases people had very limited knowledge, and/or had very limited interest in the subject.

However, the objective for this chapter is to shed some light on research that has been done in Iceland in the last two decades, since the first research was done to the modern day.

5.2 Wapen van Amsterdam

In september 1667 a Dutch ship came to Iceland from the East-Indies. What the ship was doing by the coast of Iceland is not known but one might guess that it must have gotten caught in some bad weather on the way and veered of the way and ended this far north. It is mentioned in Vallaannáll that a “great” ship from the Netherlands stranded on the south coast of Iceland and most men were lost but much was recovered from the ship.[109] The ship was called Het Wapen van Amesterdam and the ship was loaded with gold, pearls, silver and other precious cargo. According to other annals the ship was visible for quite some while after the stranding and much of the cargo was retrieved.[110]

In 1960 the farmer Bergur Lárusson was given permission by the prime minister of Iceland to search for the wreck.[111] According to newspapers from the period[112]. In 1982 core samples were done and the men searching were sure that they had found the ship.[113] In 1983 a large cofferdam was put up and sand was pumped out of the area where the ship was believed

[108] Birgisdóttir 2013. pp. 29
[109] Vallaannáll, Pp. 383-384
[110] Þorláksson, 2010
[111] Morgunblaðið 8th Nov 1960, Pp. 5
[112] No report was ever written about the search or the later excavation.
[113] Þorláksson, 2010

to be.[114] At around 14 meters of depth they came down to a wreck, however this wreck was not of the dutch ship but the German steam troller Friedrich Albert that stranded in 1903.[115]

The group kept on searching without any luck for some years after and news of their work was reported some years afterwards.[116] It is not known by the author if the group is still searching today however.

Dutch authorities knew about these searches and excavations and in 1974 the dutch ambassador for Iceland asked the Icelandic foreign ministry to inform the embassy if the ship would be found at some point.[117]

This is not a underwater archaeological project in the strongest sense since the surveying and the excavation was completely done on land, however it is included as it is the author's opinion that because of the nature of the project it is relevant to the thesis.

5.3 The Melckmeyt

In August 1992 two sport divers were diving in the harbour of the island Flatey in Breiðarfjörður. They were looking for a ship that was supposed to have sunk there around 300 years earlier. The two divers found a shipwreck there early on but it was clear that this wreck was clearly from later period. It was concluded later that this wreck was most likely the schooner Charlotte from Denmark that broke loose from the peer and stranded in the west side of the harbour in May 1892[118]. This wreck was only loosely surveyed at the time.

The second wreck was found a couple of weeks later the divers went back diving there and found a white plate with blue decorations. They removed some sand from the area with their hands and there they found remains of another wreck underneath the sand. They recovered some of the

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[114] Morgunblaðið 17th Aug 1983, Pp. 40
[115] Lúðvíksson 1984, Pp. 321-323
[116] Morgunblaðið 12 Aug 1988, Pp. 52
[117] Tíminn 2. Aug 1974, Pp. 1
[118] Einarsson 1994, pp. 137

finds from there and took it to the National Museum of Iceland[119]. This wreck showed to be the Dutch merchantman Melckmeyt that sank with all cargo and one man in the year 1659. According to annals from the time of the wrecking some of the cargo was salvaged in the following months. It is said that there were 14 guns on the ship that were salvaged soon after the stranding and parts of the ships hull and other timbers were reused later by either the locals or the crew of the ship. The annals do not concur if the timbers were taken by the locals and a ship came to pick them up with the cargo that could be saved or if they built a ship themselves from the timbers and sailed it back to the Netherlands[120].

The excavation was done the 11th to 26th of June 1993 by six divers and of those one was an archaeologist, one archaeology student, two sports divers (the same that found the wreck) one commercial diver and a photographer[121].

In a report written by Dr. Bjarni F. Einarsson, head of the excavation, the find situation and the harbour are described in great detail with information about the area around and in the harbour, both underwater and over. The harbour is lying in a crater formed north of the island. This harbour is not the modern harbour used by the inhabitants of the island today. There is a layer of sand and then mud covering the bottom of the crater with vegetation around the edges of the crater[122].

The method used was to divide the excavation area into a grid system where each square was 1X1 meter wide. The measuring was done by putting up two datum points at each end of the ship and do offset measuring from the line between these points. Each square was dredged, cleaned of vegetation and photographed before the finds were removed. The material removed by the dredge was moved to the surface into a large container where it was checked to see if any smaller finds had been dredged with the sand. No timbers were moved during the excavation, mostly because of

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[119] Ibid, Pp. 129
[120] Ibid, Pp. 138-141
[121] Ibid, Pp. 130
[122] Ibid, Pp. 136

security reasons but loose finds were taken to the National Museum of Iceland for conservation and storage.

The area excavated was roughly 40 m^2 and a great number of Dutch potteries were found there. The timbers were in good shape and treenails could easily be found in the timbers. There was an area of burned wood, thought by the excavators to be the galley.

The construction of the ship was not studied specifically during the excavation, mostly due to the time available for the excavation. The hull on one side of the ship is mostly missing, probably due to salvaging of the timbers after the stranding. It is mentioned in annals that the crew used part of the timbers to build a ship.[123] The ship seems to have tilted to one side and therefore these timbers could be salvaged. The other side of the hull is not visible since the ballast and other sediments are lying on top of it. The timbers were measured and studied and as far as can be understood the outer hull was clinker built at the bottom and caravel built at the upper part. The author explains the lying of the timbers as this -_-_.[124] The inner hull seemed to be completely caravel built. According to the author of the article the ship seems to be built of oak.[125]

There was removed around 300 pieces of ceramics, mostly of Delftware type. Furthermore there were found some tin plates, part of a shoe, bottles lead ingots and nails.[126]

As mentioned above the excavation was small and done by archaeologists with limited experience in underwater archaeology. The project was more thought as a survey and some training for the archaeologists involved.

5.4 Kolkuós

In 2006 there was surveying done around the old harbour of the old bishops settlement of Hólar. The area is called Kolkuós and is

[123] Annálar 1400-1800.111 pp. 216
[124] Einarsson 1994, pp. 145
[125] Ibid, pp. 145-146
[126] Ibid, pp. 145

positioned ca. 16 km from Hólar. The harbour was in use from Viking times[127] to the 16th century and was one of the main harbours in Iceland at the time[128]. The area was mostly unused until 1881 when the harbour was reinstated and the area was used until 1985 when the last farmers moved away[129].

The main land excavation started in 2003 and in 2006 Danish archaeologists from the Viking Ship Museum in Roskilde joined and surveyed the area[130]. Apparently the area is quite bad for underwater surveying since two glacier rivers flow into the sea there with very much fluvial sediments[131].

The methods used was using a side scan sonar to map the bottom around the area where the harbour was most likely positioned and those areas that showed potential were looked at by divers.[132]

The only remains found from the earlier activities in the area was an anchor made of metal from Viking age or Medieval times. The anchor was lifted up and sent to conservation[133].

Unfortunately there is no publication available and most of the information is found from the official homepage of the project and from Mr. Jørgen Dencker, head of maritime archaeology at the Viking Ship Museum in Roskilde, who was in charge of the underwater part of the research.

5.5 The Posthip Phønix

In a great storm in late January 1881 the Postship Phønix stranded on a reef on the south coast of the Snæfellsnes peninsula on the west coast of Iceland. The ship was on its way to Reykjavík from Copenhagen. The

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[127] http://holar.is/holarannsoknin/kolkuos/kolkuos.html 20.03.2013
[128] http://holar.is/holarannsoknin/kolkuos/hofn.html 20.03.2013
[129] http://holar.is/holarannsoknin/kolkuos/kolkuos-a-19old.html 20.03.2013
[130] Pers. Comment Jørgen Denker 14.03.2013
[131] http://www.mbl.is/greinasafn/grein/1095311/ 14.03.2013
[132] Pers. Comment Jørgen Denker 14.02.2013.
[133] http://holar.is/holarannsoknin/kolkuos/akkeri.html

ship stranded on 31st January and the whole crew managed to get into the ships boats and get on shore where 5 men walked to the next farm.

The ship disappeared into the sea and nothing was known about its final resting place until almost 125 years later.

In 2005 a commercial diver began the search for the wreck and for roughly 2 years he collected information on the ship. Finally in 2008 he had collected enough information to start the physical search for the wreck. In 2008 and 2009 a group consisting of commercial divers from the Special Unit of the National Police Commissioner in Iceland, led by Arnar Þór Egilsson, the diver responsible for the search, surveyed the area that had been narrowed down with a side-scan sonar and in 2009 the wreck was found close to shore at around 8-12 meters depth.

In the fall of 2010 the Phönix shipwreck project was founded to gather and take care of information about the ship and the wreck. In 2011 divers, with archaeologist Ragnar Edvardsson in charge, had one weeks field work on the wreck[134]. Apart from surveying and excavating the wreck, the focus of the group is to put more focus on underwater archaeology and underwater heritage management[135].

The 2011 field work was not focused on excavating the wreck. The main purpose was to measure and draw the wreck and to start photographing it. Two datum points were set at the stern and bow of the wreck. The datum points were fastened permanently, so they could be used for further measuring in the future. The wreck was surveyed in two different ways, first the wreck was measured with measuring tapes and drawings made from these, and secondly the wreck was photographed both vertically from top and chosen parts were photographed from different angles.

The survey revealed some finds that were lying both in the wreck and around it. The finds around the wreck are most likely parts of the wreck that have broken off and items that have been carried away by the current. In the wreck some finds were registered and photographed, but

[134] Edvardsson and Egilsson, 2011. Pp. 4
[135] http://postskipid.wordpress.com/um-felagi%C3%B0/ 20.03.2013

not moved. These finds are not always visible because of the movement of the sand in the area that can cover parts of the ship.

The finds that were documented were five pieces of porcelain (two dishes, two soup bowls and a broken off piece, probably from the same set as the other four pieces). These were in one piece as far as can be seen with pattern on them that can be traced to the manufacturer[136]. Furthermore, two portholes were registered, both made of copper with the glass window intact. Finally a copper valve was registered close to the boiler.

The wreck is broken in several parts, most likely as a result of the stranding, and is laying next to the reef it stranded on, with the port side laying next to the reef. The bow is severely damaged but abaft of the boiler towards the stern the wreck is in better condition, though the hull has collapsed. The lower decks are covered in sand and could therefore be better preserved than the parts above the sand.

In 2012 another fieldwork session was planned the week 21st-15th of May. The focus of this session was to make a photo mosaic of the ship. Because of problems, first some technical problems and then because of weather, work had to be cancelled on the second day without any proper results. This, as with finishing drawing the wreck will have to wait until 2013, that is if the project can be financed.

As said above, the wreck is broken in parts and parts of the wreck and most likely parts of its cargo is spread around the wreck, most of them at the east side of the wreck[137]. According to newspaper articles from the period very little was saved from the wreck and about a month after the stranding very little of the cargo and wreckage had floated to shore[138].

Further research of the wreck, specially of the areas under sand at present, would most likely yield more information on how the lower decks are preserved, giving great information on how both the hull is

[136] Edvardsson og Egilsson, 2012. Pp.10
[137] Ibid, 2012. Pp. 11
[138] Þjóðólfur, 26.02.1881, Pp. 18

preserved and what the preservation is like with other materials that might be left of the cargo. That can give much insight in preservation situation in Icelandic waters and help with planning other projects.

5.6 The Vestfirðir surveying

> *"This area has always relied on the sea for income and fishing has always played a center role in the society of the region. Fishing is still an important part of the income for the region but today various companies are looking to other industries to increase the income of the area"*[139]

Archaeological excavations and surveying in the Vestfirðir peninsula have yielded great information on both fishing, trading and whaling in and around the fjords of the peninsula[140]. That has led archaeologist Ragnar Edvardsson to take a look underwater and in 2009 and 2010 he was in charge of a project where areas in six fjords on the peninsula, Álftafjörður, Önundarfjörður, Patreksfjörður, Tálknafjörður, Steingrímsfjörður and Reykjarfjörður were surveyed. These fjords were chosen because of historical knowledge of activities in the areas surveyed. In Álftafjörður, Önundarfjörður and Steingrímsfjörður there were whaling stations. The first two had 19th century stations and the last 17th century. Patreksfjörður and Tálknafjörður were important whaling stations in the middle ages and were chosen for that reason and finally Reykjafjörður was chosen on the grounds that according to historical sources name the fjord as the place where three Basque whaling ships sunk in the 17th century.

The project focussed on two different types of research. First a desk based, historical research was conducted. This part focussed mostly on annals and other historical documents from the late 19th century to understand how many ships and boats were lost on average in the area every year. There was done some research on other time periods, though not as concise as for the time period mentioned above[141].

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[139] Edvardsson and Egilsson, 2012 Pp. 9
[140] Edvardsson, 2010
[141] Edvardsson & Egilsson 2012. Pp. 13

The second part of the project was surveying areas picked out after the historical research had pointed out the most interesting areas. Areas were plotted on a global positioning system and surveyed, mostly with a side scan sonar and a ROV. Dives were carried out at sites deemed interesting from the survey data[142].

The research yielded much information and though not very large areas were surveyed a good idea of deterioration of different sites was formed. The difference can most clearly be seen on two shipwrecks surveyed, one found in Álftafjörður, a 19th century schooner sunk there in 1901, and the possible remains of the English trawler Euripides that stranded in Patreksfjörður in 1921. While the trawler remains are scattered around the area surveyed, broken up by the storms and currents, the remains of the schooner seem to be in rather good condition. The hull is mostly remaining with copper plates covering the lower part of the hull still remaining in place. If this is because of difference in currents and weather conditions or other factors needs to be researched better.

Furthermore, the the research showed that areas close to known harbours in the area surveyed show evidence of remains from the time the harbours were in use. How much is remaining and if these remains can be used for further information is however not clear at this stage and will not be without further inspection.

Though this survey has shown promising results, a larger survey needs to be done to get a complete picture of underwater heritage sites in the area.

5.7 A Phd project on submerged archaeological record on the west/ north west region.

This project is currently in its initial stages but according to Kevin Martin, an Irish archaeologist living in Iceland he is working on a Phd project “focused on surveying the west/north west region of Iceland

[142] Ibid. Pp. 13

using methodologies including predictive modelling to build up a picture of the submerged archaeological record in these areas".[143]

At the time of this writing more has not been published or is known by the author of this thesis.

5.8 Discussion

It can be said that there has been an increase in archaeological research in the last five years in Iceland. That is of course mainly because there has been done some research in Iceland in the last five years, after almost two decades from the first research that was done. This activity can almost single handily be credited to two men, namely Mr. Edvardsson and Mr. Egilsson, both mentioned above in context with the Phønix project and the Vestfirðir project. In a conversation with the author, Mr. Edvardsson has expressed his longing to focus exclusively on underwater archaeology, after years of work on land.

The work on the Melckmeyt was a groundbreaking work that was done by archaeologists that had little experience in underwater excavations and used mainly land based methods for the research.[144] The project was a success and it is a shame that there has never been any more work done on the two wrecks.

The newer projects are very promising, and show that much can be done in underwater archaeology in Iceland, if funding can be found for the projects. These focus on survey and, in the case of the Phd project, predictive modelling, which is necessary for further development in underwater heritage management. These are however focussed on very small part of the country and to acquire more knowledge it is crucial to keep on with these projects and use the knowledge acquired to start similar projects in other parts of the country.

[143] Pers. Comment Kevin Martin 08.10.2012
[144] Einarsson 1993. pp. 141

6. Historical background

6.1 Introduction

Since the settlement of Iceland in the middle or late 9th century, the country has been dependent on sailing since many of the necessities needed to survive have always been transported by sea. To add on to that traffic of vessels Icelandic waters have always been very generous in fish, whales and other species of the sea. This has drawn fishermen and hunters from all over Europe to Icelandic shores.

These endeavours have, as is documented in the book series Þrautgóðir á Raunastund[145], been dangerous for the men involved. Ships of all sizes have sunk and stranded around Iceland because of harsh weather conditions that can change in an instant.

To get a better grip on the scale of these endeavours this chapter will focus on what historical evidence is there for Icelanders and their ships and boats up to the 20th century and other nations' sailing and fishing around Iceland.

The focus of this chapter is to summarise trade and fishing through the centuries. The purpose of this is to show the readers what the extent of shipping, fishing, whaling and trading in Iceland was.

This will be done by looking through different historical sources, both modern publishing and contemporary to the time periods in question.

6.2 Imports and Exports

Through the ages Icelandic farmers have been more or less self sufficient to a great extent. The animals have provided food and clothing, and buildings were until the early 20th century mostly built

[145] 19 Volumes about the history of the ICE-SAR or the Icelandic rescue teams and counts all vessels that sank or stranded in Icelandic waters from 1928. For more information see: Guðmundsson and Lúðvíksson, 1969-87.

from stones and turf[146]. Where wood was needed, driftwood was found in abundance in many areas around the coast. However, even though the farmers would have done everything in their power to survive on what the land had to offer some import was needed to survive.

Some wares were more important at different times in history than other. A good example of that is wine. In earlier times Icelanders made wine from berries found in the Icelandic fauna but after a papal order to the archbishop in Nidaros[147] in 1237 that sacramental wine was only allowed to be made from grapes, imported wine was needed for the church to implement the papal order, since grapes have never grown wild in Iceland. Another import that was imported by the church mostly (of course richer Icelanders would have been included there) was wax. Most Icelanders used tallow or fat for lighting but for the church, wax had more ceremonial status than tallow[148].

The most important imports for most Icelanders through the ages were flour, as Icelandic production of corn was never sufficient to be able to sustain the need for flour. Secondly timber was imported as Iceland has never had large forests that could supply timber for building, either ships or buildings and thirdly tar, since using tar on both boats and buildings would protect the timber used in these from damage and therefore reducing the need of new timber.

These were the most important imports for the survival in Iceland in the long run. As mentioned above, different imports would have been important in different times, as can be seen today. While people did not know about computers 30 years ago, most people cannot imagine living without one today.

Other goods that would most likely have been metal, glass, linen and some lead.

The amount of imports has most likely varied, and most of it would have been reserved for the upper class of the country.

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[146] Eldjárn 1974. Pp. 127-8
[147] Modern day Trondheim in Norway
[148] Karlsson, 1975 Pp. 17

According to Skarðsárannall, in 1602 the Danish King merchants trading in Iceland were obliged to supply Iceland with good, authentic wares, specially corn, beer, malt, wine, mead, liquor, cloth and other necessities[149].

The main exports from Iceland were wool, either not worked or wadmal, winter furs or dried fish. Winter furs of sheep and foxes were quite popular in Western Europe but with better connection to the east, cheaper furs were acquired and the trade of furs from Iceland mostly stopped in the 13th or early 14th century[150]. The most common fish to be exported was stockfish, which Icelanders most likely started exporting in bulk around 14th century.

6.3 Ships in Iceland

The first settlers of Iceland would most likely have used their own ships to travel to Iceland.

According to Lúðvík Kristjánsson there have been at least 100 merchant ships or seaworthy ships owned by Icelanders and 30 other ships with unknown owners from around 870-1030 mentioned in "Íslenzk fornrit"[151].

The most used boats used for fishing in Iceland until the 19th or even 20th century were small boats with four to twelve rowers, where the main way of fishing was using a line with hooks.[152].

During the 15th century sources tell that sailing ships were used for transport and that ships larger than the large twelve rower boats became more common. Boats as the twelve rower boats and smaller were the backbone of the Icelandic fishing fleet.[153] These larger ships have been found in areas where people were living in islands around the country

[149] Annálar 1400-1800 III, Pp. 189
[150] Karlsson 1975. Pp. 15-16
[151] Líndal, 1974. Pp. 199
[152] Grímsdóttir and Þorsteinsson 1989. Pp. 113
[153] Þorláksson 2004 Pp. 29-30

and where driftwood was plentiful. There these ships were used to transport livestock, provisions and driftwood.[154]

Not much changed until after the middle of the 18th century where larger fishing ships, so called þilskip (a ship with a deck), were introduced to Icelanders. Icelanders had not owned many before that time but in 1776 it is known that 42 were owned in Iceland.[155] The number of these fishing ships varied and did not reach numbers higher than the ones seen in 1776 until the middle of the 19th century. After the 1850's the number of ships varied between around 60-80 and did not rise until around 1890's and onwards with a peak around 1906.[156]

6.4 Ship traffic to Iceland

The exact number of ships sailing to Iceland at any time is hard to speculate. It is known from some written sources the number of ships at certain times. Following are a few examples of historical sources pointing out the amount of ships at a given time.

It is written that in 1118 35 ships arrived to Iceland[157].

According to Old Covenant[158], from 1262, the King of Norway would guaranty at least six ships to arrive to Iceland every year safely[159]. If these were the only ships arriving there were around 6-10 thousand people to each ship, which would only have supplied the upper class of the country.

I is also mentioned that in the beginning of the 16th century ships from the Hanseatic League started buying Icelandic stockfish. Traders from Hamburg alone sent 10 ships to Iceland yearly and in the 1530's the number of ships was up to 20. Apart from that ships from England, Lübeck, Bremen and the Netherlands came to Iceland to trade.[160]

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[154] Ibid. Pp 30
[155] Björnsson 2006 Pp. 193
[156] Jónsson and Magnússon 1997.
[157] Karlsson 1975. Pp. 17
[158] Icelandic: Gamli Sáttmáli
[159] Gamli Sáttmáli 1262
[160] Þorláksson, 2003. Pp. 30

English merchants mostly seised trade with Iceland around the middle of the 16th century and sent their own fishing vessels to fish around Iceland instead. In 1552 around 60 ships were fishing around Iceland and in the start of the 17th century they were at least twice as many or around 120.[161]

According to Skarðsannáll, in 1602 a decree was made by the Danish king, that 20 ships should come to Iceland every year, and spread their arrivals between the larger harbours of the country. If need be, the king could send more ships to make sure the supply of necessities was sufficient[162].

Basque whalers are known to have come to Iceland to hunt whales. The exact number of ships that came is not known to the author of this thesis. However it is well known that three of these whalers sank in Reykjafjörður in 1615, where they had their main base for the season.[163] The Basque came to Iceland for whaling most of the 17th century, though it is believed that they stopped around 1670's.[164]

The lack of general information on ships sailing to Iceland from mainland Europe between the 17th and 20th century could result from little change in the period regarding sailing to Iceland. The trading system in Iceland changed very little, with the largest change was the abolishment of the Danish-Icelandic trade monopoly which ended in 1787.[165]

6.5 Ships lost around Iceland

To find out how many ships have sunk or stranded around Iceland is material for a whole thesis in it self. This chapter is not meant to give full report of ships stranded or sunk, but rather an idea of the amount that could be found by doing a full historical research on the

[161] Þorláksson 2003 Pp. 152
[162] Annálar 1400-1800 I, Pp. 190
[163] Þorláksson 2003. Pp. 274-275
[164] Ibid, Pp. 303.
[165] Björnsson 2006. Pp. 242

subject. The material is gathered from three annals spanning a time period from 1392-1658. Furthermore information was gathered from two more that will be used for statistics without going into the same detail as the other three.

The material has not been filtered specifically to see if wrecks can be found in the area or if ships were retrieved later. This is just to get a crude overview of ships that have stranded or sunk. Furthermore, the material has not been cross-referenced so some of the incidents mentioned can possibly be mentioned in more than one annal. Finally boat losses are deliberately left out since these are harder to find than larger ships. After seeing what has happened to larger ships stranding in modern times around the coast of Iceland it is the authors' opinion that smaller boats would be more likely to break up on the shore than larger ships.[166]

The chapter will be divided into different annals where the larger ships will be mentioned specifically. Place names that are used will not be explained in detail, nor where the ships came from. Doing that would fill great amount of space and would take focus from the point.

6.5.1 Nýji Annáll 1393-1430

In this annal ship or boat losses are mentioned seven times in total. In these at least three mention larger ships.

The first is in 1402 where there is mention of a ship stranding where "many" men were lost and so was the cargo.[167]

Next mention of a larger ship being lost is a ship where a ship called "Svalaskipið" is mentioned sinking in 1412. There XL and C men were on the ship and that of these 13 managed survived the wrecking and of these four died afterwards.[168]

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[166] http://batarogskip.123.is/blog/2011/11/03/549574/ Photos of a 214 ton steel ship that stranded in 1988 outside of Grindavík. The parts shown on the photos can be found up to a fews hundred meters inland.
[167] Annálar 1400-1800 I, Pp. 9
[168] Ibid. Pp. 17

In 1419 it is mentioned that on Maundy Thursday came a storm and English ships sank or stranded around the country. It is mentioned that the number of ships lost was not less than 25.[169]

6.5.2 Skarðsárannáll 1400-1640

In this annal ship or boat losses are mentioned 35 times in total. In these, twenty ships are mentioned stranded or sunk. [170]

In 1431 it is noted that Jón Biskup (Johannes Gerechini, a danish bishop in Skálholt from 1426[171]) sent a letter regarding ownership of wreck and cargo of a ship that stranded earlier. By the description of the cargo it can be deducted that the ship was a rather large ship.[172]

In 1599 it is mentioned that a ship owned by Germans stranded in Hrútafjörður.[173]

A ship was sent in 1600 to retrieve the ship stranding the year before in Hrútafjörður. This ship stranded as well close to the spot where the other ship from the year before stranded.[174]

In 1601 the third ship was sent to retrieve the two stranded in Hrútafjörður. It managed to pull one out but the second broke up. It is not mentioned how badly or if any of the timbers were retrieved.

In 1603 a merchant ship stranded, it is not mentioned where, only that some of the cargo was retrieved.[175]

In 1606 a merchant ship stranded close to Grindavík. Very little of the cargo was retrieved. [176]

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[169] Ibid. Pp. 22
[170] Annálar 1400-1800 I, Pp. 54
[171] Westrin 1910. Pp. 38
[172] Annálar 1400-1800 I, Pp. 54
[173] Ibid, Pp. 183
[174] Ibid, Pp. 185
[175] Ibid, Pp. 186
[176] Ibid, Pp. 195

In 1609 a merchant ship stranded close to Grindavík again. Furthermore another merchant ship stranded outside of Garður, that ship was saved and could sail again afterwards.[177]

In 1615 it is mentioned that seafaring ships broke because of ice. It is not mentioned how many, where or what kind of seafaring ships those were.[178]

In 1616 three ships stranded around Iceland. One English ship stranded on the north coast and two Spanish ships in the Westfjords.[179]

In 1618 three English ships stranded. Two of the ships stranded on the south coast and one in the westfjords. One man survived from the latter one.[180]

In 1621 two ships were lost. One stranded south of Keflavík and a Danish whaler sent by the king of Denmark broke because of Ice.[181]

In 1627 a French whaler stranded in the Westfjords, 16 men got to the boats and survived.[182]

In 1629 a merchant ship got loose while it was being unloaded in Miðfjörður and drifted to shore. The ship was to damaged to save but most of the cargo was saved.[183]

In 1633 a sail ship sank in Herdísarvík. All men on board were lost.

I 1635 a merchant ship was noted to have stranded, it is however not clear by the text where it stranded. It may be that the ship stranded when coming back to mainland Europe.[184]

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[177] Ibid, Pp. 196-197
[178] Ibid, Pp. 203
[179] Ibid, Pp. 205
[180] Ibid, Pp. 208-210
[181] Ibid, Pp. 215
[182] Ibid, Pp. 226
[183] Ibid, Pp. 230-231
[184] Ibid, Pp. 244-245

In 1638 it is mentioned that men drowned on a ship by Flatey, it is however not mentioned if the ship stranded, it sank or if the men fell overboard.[185]

In 1839 a merchant ship sank close to Grindavík. The ship and cargo was lost, however all men survived.[186]

6.5.3 Seiluannáll 1641-1658

This annal is more vague than the previous two about what kind of ships the text refers to. It is however the authors opinion that when ships are mentioned here with named after one of the main merchant harbours it is most likely to be one of the merchant ships coming from abroad.

This annal mentions 10 incidences where ships or boats sank or stranded. Of these, 8 ships are mentioned.

In 1641 a merchant ship is mentioned stranding, possibly by Keflavík or by the south coast. It is not very clear by the text which area he ship stranded in. [187]

In 1642 a merchant ship stranded by Slétta with most of the cargo, all men survived. At a similar time another merchant ship stranded with most of the cargo and one man.[188]

In 1644 a merchant ship stranded by Strandir with all cargo and four men.[189]

In 1653 a merchant ship stranded by Múlasund. It is not mentioned if any cargo was saved. Most men survived.[190]

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[185] Ibid, Pp. 253
[186] Ibid, Pp. 256-260
[187] Annálar 1400-1800 I, Pp. 282
[188] Ibid, Pp, 283
[189] Ibid, Pp. 284
[190] Ibid, Pp. 302

In 1654 a ship is mentioned stranding in Húsavík while retrieving cargo from a ship stranding the year before after colliding with the previous one damaging both ships beyond repair. The previous ship is not mentioned in this annal.[191]

In 1656 a ship sank while lying by Höfði. No mention of loss of cargo or life.[192]

6.5.4 Other annals and discussion

As can be seen in these examples, many ships sank and stranded around Iceland during the ages. Some of these sank in deeper waters away from land, others in the deep fjords around the country and yet some stranded. The preservation of these ships is unknown but from the little knowledge that is from researches mentioned in chapter 6 there might be much to find.

According to the annals looked at, which were Nýji Annáll from 1393-1430, Skarðsárannáll from 1400-1640, Seiluannáll from 1641-1658, Vallholtsannáll from 1626-1666 and Vallaannáll from 1659-1737.

In these ships stranding, sinking or disappearing are mentioned 95 times in total. In these over 500 ships and boats are reported stranding sinking or disappearing. Some of these ships could be saved and used again while some broke completely on the shore. It is difficult to know by the text since the word used in the annals for stranding in the Icelandic word used for stranding in the annals is “brotna” which is the word for break.[193]

Furthermore, of the over 500 boats and ships mentioned close to 100 ships are mentioned in these annals to have stranded or sunk.

This information was gathered by going through one of the six volumes available of Icelandic annals to around 1800. Much more could be learned by going through all annals, cross-referencing the information and from

[191] Ibid, Pp. 304-305
[192] Ibid, Pp. 308
[193] Annálar 1400-1800 Pp. 9-539

that deduct areas that could have be interesting. However, that is material for another thesis by itself.

6.6 Discussion

As explained above, sailing has been extremely important to people in Iceland. Icelanders have been dependent of import of important material for survival such as flour, timber, tar and metal.[194]

The amount of merchant ships varied through the years and centuries as did the amount of larger fishing vessels. Icelandic vessels were mostly rowing boats with up to twelve rowers where the fishermen fished with line and hooks.[195] Icelanders started building up a fleet of larger ships for fishing, slowly changing lines and hooks with nets, around the end of 17th century.[196]

Icelandic weather can change fast and ships that do not manage to get to shelter are under the mercy of the storm and the sea as can be read about in chapter 5. The steamship Phønix did not stand a chance against the storm when it hit. Both annals and modern reporting tell of many ships stranding and sinking around the coast of Iceland. The total amount is unknown, and will most likely never be known.

It can safely be deducted that much more wrecks lie hidden on the bottom of the ocean around Iceland than the ones that are known today. Some might already be lost because of the waves of the ocean close to coast, the materials have corroded away or they have been damaged because of human intervention.

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[194] Karlsson 1975, Pp. 15-17
Þorláksson 2003, Pp. 37
Þorláksson 2004, Pp. 59-60
Björnsson 2006, Pp. 102-103
Agnarsdóttir 2008, Pp. 95
[195] Þorláksson 2004, Pp. 29
[196] Þorláksson 2004, Pp. 40

7 Surveying

7.1 Introduction

With the development of modern technology, the tools and methods available for surveying the seafloor have changed substantially. The invention of modern day diving equipment has allowed man to go to the bottom of the ocean at its deepest point in a submarine[197] and makes breathing under water possible, either with SCUBA (self-contained underwater breathing apparatus) or with surface supply (has been experimented with for a long time, will not be discussed in detail here). However, diving has very limited possibilities for search in large areas of water. That is caused by number of factors; the diver can not move very fast underwater, if the visibility is bad the diver has to rely on his hands for search, limiting his search area substantially, diving is not recommended in harsh weather conditions for safety reasons to mention some of the reasons. In bad visibility a diver can swim around a large shipwreck 5 times without seeing it, if he has not 100% control over where he is and where he is searching.

Furthermore, as technology in sports diving and more people take up recreational diving, more submerged heritage sites are bound to be found. With the limited access to money archaeologists and the National Heritage Agency in Iceland have[198] full investigation will not be possible in most cases. According to Bates and Lawrence[199] a full multi-disciplinary research will be needed to fully understand a site properly. This will include an integration of geophysical (remote survey), physical (sedimentological and engineering), biological, chemical, geographical and historical applications. This will only be possible in very few cases, but with proper management many sites can be assessed using some of these methods and from the information gathered required measures can be taken to protect the heritage sites in question.

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[197] http://news.discovery.com/earth/james-cameron-relives-deepest-dive-121206.html 06.12.2013

[198] See table 2.1

[199] Bates and Lawrence 2001, Pp. 66

Therefore, geophysical methods and remote surveying methods are widely used for surveying underwater, even before a single person gets their shoes wet (that of course depends largely on the vessel used for the surveying and the weather). In this chapter these methods and instruments will be explained shortly and the pros and cons of these different methods will be discussed.

7.2 What are geophysical remote-sensing surveys?

With the focus of archaeology changing in modern times away from the focus of collecting the biggest collections of valuable items to understanding the society and the relation between the items and the people that made and used them, maritime archaeological methods have changed from pure treasure hunting of the past to a discipline where the recording often becomes more important than the recovery of items[200].

The instruments and techniques mostly used in archaeology can be split into three categories[201]

- Acoustic systems
- Magnetometers
- Submersibles

These all have the advantage over divers that these can be operated from a boat or a ship and therefore are less vulnerable to bad weather. Many times instruments from two or more of these categories are used to get the best result for the survey.

7.3 Acoustic systems

Acoustic systems are the most commonly used methods used for geophysical surveys. There are different types of acoustic systems used, some more than other, depending on the nature of the survey. With these systems both the exposed material on the seafloor and the material lying hidden beneath the seabed can be analysed.

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[200] See the 2001 UNESCO underwater convention articles 2.5 and 2.10
[201] Bowens, 2009, Pp. 103

7.3.1 Echo-sounders

Echo sounders are found in most fishing boats as they are the most common tools for depth measurements and for finding schools of fish. Echo-sounders work by sending an acoustic pulse with single frequency ranging typically from 100-300 kHz and a frequency-dependant, vertical resolution on a centimetre scale. The echo-sounder scans a small circular area by sending the pulses in a circular motion with a cone angle between 5-45°. The resolution varies in proportion to the water depth, source frequency and cone angle. "For example, a 200 kHz echo-sounder with a 10 degree cone angle has a footprint diameter of 1,8 m in a water depth of 10 m."[202]

The echo sounder systems are normally made of one transducer that functions both as a transmitter and receiver and is mounted either directly under the hull of the vessel used or on a pole mounted somewhere on the vessel. The data produced is normally presented as profiles or two-dimensional contour plots.

The echo sounder is practical to use for surveying because of low cost and easy access. On the negative side, the accuracy of the results compare poorly to swaths surveys, with resolution of roughly ±5 m and take very long time to conduct compared to those.

7.3.2 Multibeam Swath Systems

Multibeam swath systems (MSS) have in the recent years become one of the most popular tools used by archaeologists because of how effective it is both regarding speed and resolution. Compared to the echo sounders the MSS covers substantially larger area in each run over the area. An example is that a typical MSS in similar depth of water as the example of the echo sounder above would cover a track something close to 55 m wide[203].

[202] ibid. Pp. 105
[203] ibid. Pp. 105-106

The MSS is a development from the echo sounder where depth measurements are recorded in a thin strip below and to the side of the boat instead of in a circular motion underneath it as with the echo sounders. The pulse repeats about 50 times a second as the boat moves forward. The speed of the boat varies greatly by the depth of the measurements since the deeper the measurements are, the longer it takes for the sound to bounce back to the receiver so to be able to get accurate measurements, so the ping rate has to be reduced for the echoes to return before the next pulse is transmitted. This reduces the speed possible for the vessel mounted with the sonar head array.

The sonar head arrays can be mounted on multiple different vessels, like ships, smaller boats, frames mounted on these vessels, towed platforms or even an ROV. All these have different advantages and disadvantages relating to size and control. For example while a larger vessel is more expensive, it is much easier to hold a relatively straight course and is much more stable in rough weather than smaller vessels are. An ROV might be suitable for deeper surveys but is highly unpractical financially when used in lesser depths than using a boat. What vessel is practical must be evaluated with every survey.

MSS can be extremely accurate with resolution around 5 mm horizontally and 6 mm vertically[204]. With that kind of resolution the MSS can be used for both surveying and monitoring archaeological sites with very good results.

Problems with MSS have mostly been regarding cost, since MSS needs relatively expensive equipment. Furthermore, MSS generates, huge amounts of data, with up to 10 GB of data produced per day. However with computers becoming faster and storage becoming more affordable, that is a problem that is becoming smaller and smaller every year. Another problem is that if an inexperienced person is interpreting the data archaeological sites can easily be overseen. Computer programs do not have the same ability to separate and identify relevant and irrelevant data as the human eye, so training in understanding and interpreting the data is essential before a person goes out surveying.

[204] Ibid, Pp. 106

7.3.3 Bottom Classification Systems

Bottom classification systems use acoustic pulses just like echo sounders and MSS, however instead of just giving information about the topography of the sea bed the technology can give information on different types of sediments on that form the sea floor. This has been used in archaeology on very small scale in recent years[205].

This is done by analysing the data that is acquired from the pulses with computer programs. It has been possible to distinguish differences in bottom solidity before echo sounders became digital and computers were used to process the data.

7.3.4 Side Scan Sonar

Side scan sonar is probably one of the most used surveying method in underwater archaeology. A tow fish is pulled either by a boat, ship or an ROV, where the fish sends out acoustic pulses but instead of calculating the depth, the intensity of the sound scattered back is displayed. The most commonly used systems work at different frequencies depending on the resolution needed for the survey, 100 kHz for surveying larger areas and 500 kHz for more detailed surveys where higher resolution is required. Higher frequencies are available, however these have very small range and are only useful in very special circumstances.

Previously the results would be printed out in real time on a long strand of paper and the surveyor had to go through the results. Today however most systems are connected to a laptop computer. This has made the interpreting process much easier, since computer programs offer great help in the process.

The images produced give a good idea of how the seafloor is composed since different materials reflect in different ways. Solid materials

[205] Ibid, Pp. 107

like metal and rocks reflect the pulses better than gravel or sand and are therefore displayed differently on the images. Another factor that side scan sonar displays, and is most likely the most important factor about this type of surveying, is that because there are areas behind the objects that are not hit by the pulses, acoustic shadows are displayed on the images. These tell much about the size of the objects in question, the larger the shadow, the larger the object that makes it.

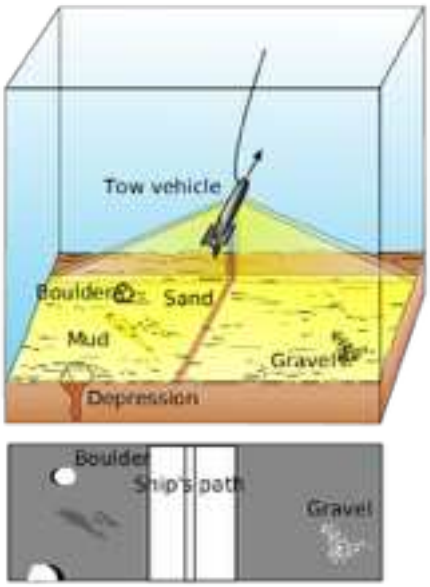

Fig 7.1 Side Scan sonar

Side scan sonar has become one of the most common tool maritime archaeologists use for their surveying because of good results that it can produce and the relative low cost of the surveying compared to other methods. Surveying with side scan sonar is relatively easy to do since the main problem that needs to be avoided is not to overlap the search patterns enough to make sure the area is covered properly. The results of the surveying can then be taken to a more experienced surveyor to interpret. The largest problem with side scan sonar on the other hand is that objects can easily be overseen by the surveyor, either because of lack of experience or lack of focus by the surveyor. Side scan sonar data is displayed as a rolling image and therefore looking at it for a long time can be tiring, and therefore lack of focus can easily become a problem.

7.3.5 Sub Bottom Profiling

The final method of acoustic systems discussed in this thesis is sub bottom profiling. As the name indicates this method focuses on mapping what lies underneath the surface of the sea floor. With sediments moving constantly on the sea floor, knowing what lies underneath the surface is impossible without methods to penetrate the surface. This is well known in land archaeology where geophysical surveys are widely used for

understanding what lies in the ground. Other acoustic systems make a map of the ocean floor where objects penetrating the surface of the sea floor but give little or no understanding either of what materials the sea floor consist of or what lies underneath it.

Sub bottom profiling systems send high frequency pulses (roughly 3-10 kHz) that penetrate the seabed and record the reflection of the pulse. Higher frequency pulses give higher resolution but travel only short distance into the sea bed compared to lower frequency that travels further down but gives lower resolution. Coarse sediments give more resistance that finer and therefore the penetration of the pulses is highly dependent on the consistency of the sea floor.

The return of the pulses is recorded and with knowledge of the speed of sound through different sediments acquired through measurements of known materials the data can be converted into a two dimensional image of the cross section.

There are two main types of sub bottom profiler systems, single frequency pulse systems, often called pingers or boomers, and swept frequency pulse systems, often called chirp profilers. Pingers operate by sending pulses of high frequency into the sub soil and will give resolution of 0,3-0,5 m and penetration of 20-25 m. Boomers work on lower frequency and penetrate further into the subsoil, normally around 50-75 m but with lower resolution than the pingers, normally around 0,5-1,0 m. Chirp profilers work by sending broad spectrum of frequency pings into the subsoil. By doing so it is possible to get part of the penetration capabilities of the boomers and qualities better than pingers, with resolution of roughly 20-30 cm and over 30 m penetration[206].

Results from sub bottom profiling require much more experience than most other geophysical surveying methods. Anomalies can be confused with natural phenomena if the surveyor does not have the required experience or knowledge. The surveyor preferably needs to know how the sediments in the area are portrayed on the image produced for optimal results. For

[206] Ibid, Pp. 111

archaeology using boomer and chirp systems is by far the most optimal, both acquiring optimal resolution and the depth.

7.4 Magnetometry

Magnetometry is a widely used method in archaeology, since it is excellent in spotting wrecks or find assemblies that include metal. Magnetometers measure variations of the earth's magnetic field, caused by ferrous metals. These can be found in many shipwrecks through the ages, both as cargo and as part of or as the whole structure of the hull, specially in later times. These are both used in land and marine surveys. When used in marine surveys the magnetometer is normally towed behind the vessel, to prevent the vessel to create interference to the measurements. The main types used are proton precession magnetometer, caesium magnetometer and overhauser magnetometer. The first mentioned has been the most widely used through the years, but in the more recent years the later two have become more frequently used. This is mostly because of the different recording rate (0,5-2,0 second for proton, 0,1 second for caesium and overhauser) and the much better sensitivity in the caesium and overhauser magnetometers (0,02 nT on the caesium and overhouser versus 0,2-1,0 nT[207] on the proton ones)[208]. The proton type has kept its popularity partly because of low cost and the smaller size of the tow fish used.

The main problem with using magnetometers is that the sea floor can be littered with ferrous materials, both refuse from ships sailing by the area and ferruginous rocks, that do not interest archaeologists. Luckily techniques have been developed to differentiate between some of the natural phenomena and shipwrecks and with a keen eye, an experienced surveyor can often spot out what is refuse and what is archaeological material.

[207] 1 nT = 1 gamma
[208] Ibid, Pp. 111

7.5 ROV's and AUV's

The final option mentioned here for surveying, without using divers is an option that is often used instead of divers. Divers are always dependent on air supply, decompression and fatigue, while ROV's (remotely operated vehicles) and AUV's (autonomous underwater vehicles) are not. Armed with acoustic and video recorders these can go places divers would often not go and do visual surveys in shorter, more effective ways than divers would. These vehicles can go to great depths and through the evidence collected through these means decisions about further options on the site can be decided.

7.6 Predictive Modelling

Predictive modelling has been used in underwater archaeology for quite some time. In 1991 Norsk Sjøfartsmuseum published research by Dag Nævestad on underwater heritage protection and management.[209]

Many factors need to be taken into account when looking at heritage management. To make the work more systematic, number of tools can be used to mitigate the damage done to heritage. With the size of the underwater area around Iceland, it will take years if not decades with expensive tools to survey every part of Icelandic coastal waters. Therefore the use of predictive modelling, where any area that could be under threat is evaluated out of number of criteria, can help narrowing down the area needed for surveying. Much work has been done on land[210], but when comes to areas under water nothing has been done apart from the work done by Mr. Edvardsson and Mr. Egilsson in the West fjords.[211]

7.6.1 Desk based assessment

To know the most likely areas to have underwater cultural heritage preserved, the research needs to start in the library. Much can be learned by looking at annals, maps and historical evidence from the

[209] Nævestad, 1991
[210] Magnúsdóttir, 2009.
[211] See chapter 4.6

area.[212] According to the Unesco Training manual for future maritime archaeologists the sources that can include evidence on underwater cultural heritage is the following: "literature, maps, charts, aerial photographs, sites and monuments data, wrecks data (public and private), geophysical and geotechnical data, related marine sciences, newspapers, satellite imagery, naval/wartime records, hydrographic survey and visual information from the local people".[213]

A fjord with no history of settlement or shipwrecks is highly unlikely to yield many finds, and may therefore be prioritised lower than a fjord where fx. a town or a whaling station. When looking at two of the projects in chapter 5, namely the Vestfirðir surveying and the Phönix Shipwreck Project, work started by mapping out the areas most likely to yield information[214].

This work is of course much easier if some work has previously been done in relation to predictive modelling.

7.6.2 Preservation conditions

Preservation conditions are the most important factor when it comes to preservation of organic material underwater.[215] A piece of any organic material can rot or corrode away in short time if it is open to oxygen and some bio-organisms[216]

In Australia scientists have been researching the factors most important to the preservation on organic materials underwater since the early 70's. These are the main factors they have found out are most influential on preservation under water:

- Temperature
- Salinity
- PH and dissolved Oxygen Content

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[212] Magnúsdóttir 2009, Pp. 10
[213] Tilburg and Staniforth 2012, Pp. 8.
[214] Edvardsson and Egilsson 2011, Pp. 13
Edvardsson and Egilsson 2012, Pp. 8
[215] Nævestad 1993, pp. 11
[216] Probably the most famous example is the RMS Titanic and her sister ship the HMHS Britannic, see Bright et. al. 2005

- Water movement and purity
- Bottom type
- Corrosion products and marine concretions[217]

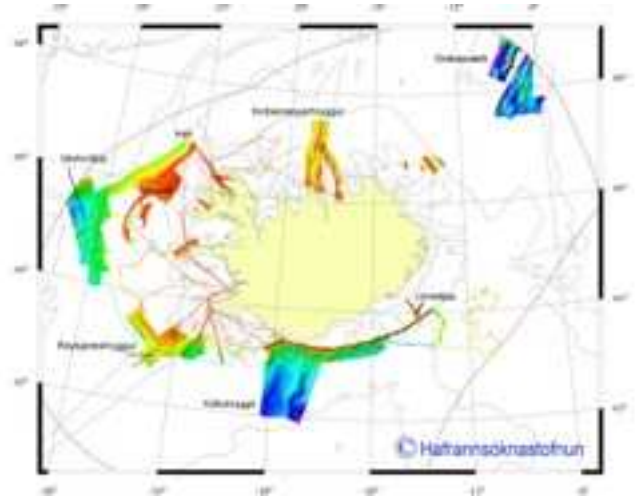

Fig 7.2 A map of the area mapped by the Marine Research Institution

Much is already known about some of these factors, such as salinity, temperature and water movement around Iceland.[218] The Marine Research Institute of Iceland has furthermore been mapping the area inside Iceland's exclusive economic zone with a multibeam echo sounder.[219] As can be seen on Fig 7.2 large areas have been mapped, but much work is still to be done. This work however has not at all been done in any cooperation with the national heritage agency or any other archaeologists.[220] This work could possibly be used in cooperation with the National Heritage Agency to gain more information on shipwrecks in the Icelandic exclusive economic zone.

7.6.3 Impact Assessment

When evaluating the possible damage on cultural heritage, the scope of the possible damage needs to be evaluated. Mr. Nævestad comes up with an example of different types of work and puts them into two categories of works that can change or damage cultural heritage. These are:

"High Priority, Irreversible constructions that lead to damage of materials:

-Dredging, sand and shell sand removal.

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[217] McCharty 1982, pp. 50
[218] http://www.hafro.is/Sjora/ 27.11.2013 Homepage of the Marine Research Institute of Iceland.
[219] http://www.hafro.is/undir_eng.php?ID=10&REF=2 27.11. 2013
[220] Pers comment. Kristín Huld Sigurðardóttir 06.12.2012

-Landfills, dropping of solid masses, building of installations in the sea and larger pipelines

Lower Priority, work that leads to different degrees of change to the environment that can lead to damage:

- Dumping of loose masses
- Exposed material in and around wrecks and harbours to uncontrolled diving
- Smaller pipelines and cables
- Drainage of areas
- Fish farms (Cages)"[221]

As such this is not really part of the predictive modelling. When it comes to this stage, predictive modelling of the area should preferably be done, so the National Heritage Agency in Iceland should have an idea of zones that should be surveyed or monitored.

7.7 Discussion

Much work has been done with remote surveying in the last couple of decades, and has become one of the most important tools used in underwater archaeology.[222] These methods give the archaeologist tools to survey large areas that would, with other methods such as divers, be hard or impossible to survey inside the timeframe and the financial frame offered to archaeologists. Large areas of seafloor can be surveyed in mere days that would take divers or even ROV's weeks or months to survey.

These methods with the help of predictive modelling, are vital to monitoring and protecting underwater cultural heritage. As mentioned above, areas can be outlined for surveying by doing a thorough desk based assessment, and from there surveying can be done with the methods deemed best by the researcher. Anomalies found with remote surveying can then be assessed by sending either divers or a ROV, equipped with a video camera down to the site.

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[221] Nævestad 1993, Pp. 12-13
[222] Church and Warren 2008, Morang et.al. 1997, Bates et.al. 2011.

8. Conclusion

8.1 What have you learned?

The main focus of the thesis is to increase the understanding of underwater heritage management in Iceland. To do that the thesis has been split up into six chapters, to make the information clear for the reader.

The first chapter summarises the legal environment in Iceland and puts the current law into context with the historical overview of the changes in heritage law through the last century. The law has been updated three times in the last 25 years after having seen decades without changes before.

The most recent law states that all cultural heritage over 100 years is automatically protected, whether on land, sea, river, glacier or lake, without any special protection needed from the National Heritage Agency. Every find of cultural heritage must be reported to the National Heritage Agency immediately. The management of cultural heritage is in the hands of the national heritage agency, though all loose objects must be handed to the National Museum of Iceland for safekeeping. Same goes for reports from every research done.[223]

The main changes done in regards to underwater heritage protection with the most recent law, is that for the first time it is specifically stated that cultural heritage under water is protected. However, in the law the distance of the protected zone in the waters around Iceland is not included, as Norway, Denmark and the Faeroe Islands have done.[224]

Icelandic archaeology is mostly done on commercial basis, the state does not partake in archaeological excavations. Rescue excavations are paid by the contractors working at the site. Other projects are mainly funded through Minjasjóður, a state financed fund, where the money goes

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[223] Þjóðminjalög nr. 80/2012

[224] Lov 1996-11-29 nr. 72: Lov om petroleumsvirksomhet
Lov nr. 473 af 7. Juni 2001, museumsloven med ændringer
Løgtingslóg nr. 92 Frá 21. Desember 2004 um vernd av fornlutum í havinum

to projects that involve cultural heritage research such as archaeological excavations and surveys and restoration of ships.[225]

Funding for cultural heritage research has been reduced heavily in the last five years due to lack of construction projects that need excavations and lower amount of money on state finances for Minjasjóður. Since 2008 the total amount for cultural heritage research has gone from 122.200.000 Isk. to 32.200.000 Isk. today[226]. Furthermore, included in the responsibilities of Minjasjóður, which was not included until 2013 is the possibility to receive money from the fund for ship restoration. So not only have the finances for cultural heritage research been cut down, more responsibilities have been put on the fund.

To understand the Icelandic laws in a broader context a short summary of the laws of five neighbouring countries is given, namely Norway, Denmark, Sweden, the Faeroe Islands and Ireland. The laws in the different countries are in many ways very similar. The largest difference can be found where it comes to age of the automatically protected remains in Norway compared to Iceland an the other four countries. In Norway the protection period is set by a specific date, 1537, while in the other countries it is set at 100 years from the current date. Furthermore, in Denmark, Norway, Ireland and the Faeroe Islands archaeological work is in the hands of specific museums or institutions, while in Iceland and Sweden commercial archaeology is used.[227]

Second chapter summarises international conventions and recommendations that have had influence on underwater cultural heritage management and which international conventions and recommendations Iceland has signed and ratified.

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[225] Þjóðminjalög nr. 80/2012
[226] [226] Numbers are from finances of the Icelandic State with added information from Félag Íslenskra Fornleifafræðinga.
[227] Lag (1988:950) om kulturminnen
Lov 1978-06-09 nr. 50: Lov om kulturminner
Lov nr. 473 af 7. Juni 2001, museumsloven med ændringer
Lög um menningarminjar nr. 80/2012
Løgtingslóg nr. 92 Frá 21. Desember 2004 um vernd av fornlutum í havinum

The first seven conventions and recommendations summarised in this chapter build up to the last convention explained, namely the "2001 Underwater Convention". The previous ones, with the first one drafted in 1954 define cultural heritage and how it should be dealt with on a broader international scale. The build up goes from acknowledging cultural heritage on a broad international scale in the "Hague Convention"[228] to the states responsibility of responsible handling with cultural heritage in the "New Delhi Recommendation"[229] and finally culminates with the drafting of ground rules for activities directed at underwater cultural heritage in the "2001 Underwater Convention"[230].

Iceland has signed three of the conventions mentioned, namely the "European Convention on the Protection of the Archaeological Heritage" from 1969, the "World Heritage Convention" from 1972 and the "Valletta Convention" from 1992[231]. Iceland did however not sign the 1995 revision of the Valletta convention and is therefore not regarded as a signatory of the convention. Regarding to underwater cultural heritage, it was the intention of the government in charge in 2012 to ratify the "2001 Underwater Convention", however after further consideration Iceland has dropped those plans because it is the ministry's opinion that the convention clashes with the Law of the Sea Convention.[232]

The third chapter summarises sports diving in Iceland and how sports divers can influence underwater cultural heritage, dive laws and regulations in Iceland, dive regulations for work in archaeology and ends with one suggestion what can be done so divers can see and learn from underwater cultural heritage.

It is apparent from the chapter that wreck diving is not unknown to Icelandic sports divers. However not many protected wrecks are publicly

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[228] Convention for the Protection of Cultural Property in the Event of Armed Conflict 1954, Revised 1999
[229] Recommendation on International Principles Applicable to Archaeological Excavations 1956
[230] Convention on the Protection of the Underwater Cultural Heritage 2001
[231] http://www.minjastofnun.is/um-stofnunina/log-og-samthykktir/althjodlegar-samthykktir-og-sattmalar/ 04.12.2013
[232] Pers. Comment Ragnheiður Helga Þórarinsdóttir 14.11.2013

known and therefore most divers that do wreck diving mostly dive on wrecks less than 100 years old.

Sport divers in Iceland generally seem to have little knowledge about the heritage protection law, though most seem to regard wrecks as something to dive on, not to touch or damage.

Icelandic dive laws are very clear on who is allowed to do work under water. Only qualified commercial divers, with a certificate approved of by the Icelandic Maritime Administration. Furthermore regulations issued by the appropriate minister regarding dive logs, dive equipment, dive planning and other parts of dive administration must be followed at all times when dive operations are being conducted in any body of water in Icelandic territory or from Icelandic vessels.[233] Though no direct mention is of archaeological work in those laws these laws or regulation it is the authors understanding that archaeological work underwater, either surveying or excavation, should be regarded as a commercial dive operation.

Finally, as an example, the “wrecks as museums” concept is discussed. The concept is known both from Sweden and the USA where the Internet can be used as a medium to convey information to divers wanting to explore shipwrecks underwater. Information about the ship can be put on the Internet with photos and even videos so divers can plan their dive and get the most out of it. Plaques can be put up by the wreck with information about the wreck and what the divers are seeing. This could help get divers more interested in underwater cultural heritage protection.

In the fourth chapter six projects regarding underwater heritage are discussed. Out of the six projects four of them have ben done in the last 12 years and three have been done in the last five years, or are still in progress. The current projects are focused on surveying and getting more information about the status of underwater heritage in Iceland. It is furthermore apparent that only one archaeologist in Iceland is currently working on underwater heritage. The information

[233] Reglugerð um köfun 0535/2001

gathered suggests that remains that are lying on the bottom of the ocean, far enough from the shore not to be broken down by storms and waves are in rather good condition.[234]

Fifth chapter summarises briefly historical evidence of trade, ship ownership and ship losses in and around Iceland through the ages. It is clear that Icelanders have always been dependent on certain goods being imported. Therefore there has always been some ship traffic between Iceland and other countries. Furthermore, a large number of ships, both Icelandic and from countries like Germany, the Netherlands, Basque country, England and Denmark have been in Icelandic waters for fishing and whale hunting.

By going through historical evidence such as annals it is clear that number of these ships have been lost around Iceland, where the ships have either sunk or stranded around the coast of Iceland. The research done for this thesis is however just a small example of what evidence there is in historical sources on the subject.

Finally, in the last chapter, one of the most used tool in underwater cultural heritage research is clarified. The different remote surveying methods are explained. There, acoustic systems, magnetometers and submersibles are discussed and their use in archaeology is described.

The final part of the last chapter explains predictive modelling, and it’s use in underwater heritage management. The different factors that are used to make a prediction on the likelihood of finding cultural heritage in certain areas are discussed. The main factors used to make an accurate model are, historical evidence, preservation conditions such as temperature, salinity, ph and dissolved oxygen content, water movement, bottom type and corrosion products and marine concretions. The work on historical evidence was discussed in chapter number six and will not be explained further. Preservation conditions are immensely important and without information on these it can be difficult to evaluate the possibility of cultural heritage remains to be found in the area without a full survey. Much of this information is already

[234] Edvardsson 2010, Pp. 6-9

available from the Marine Research Institute of Iceland and with cooperation between the Institute and the National Heritage Agency, much work could be done in mapping out areas that should be monitored.

8.2 What are the main challenges in underwater heritage management in Iceland?

Underwater heritage management has mostly been neglected in Iceland up until now. The National Heritage Agency has no official protocols how to monitor underwater cultural heritage, though work in that direction has been discussed in the Agency.[235] However, without special financial backing it is unlikely that the work will be done in the nearest future.

With the lack of official protocols, as can be found on land, underwater cultural heritage is often ignored when it comes to planning for projects that could damage underwater cultural heritage.

Furthermore, it seems as though most Icelandic archaeologists completely ignore the existence of underwater cultural heritage. According to the authors knowledge only one archaeologist mentioned the need to discuss underwater cultural heritage further when the discussions regarding the current heritage law while was still in the preparation stages. When cultural heritage protection is being discussed at formal meetings with archaeologists, it is very seldom if ever on the agenda to increase the awareness of underwater cultural heritage protection. If this is because of lack of interest or knowledge cannot be answered on these pages.

Because of the lack of both official protocols and lack of interest or knowledge by Icelandic archaeologists the sports diving community has not been informed properly how the legal environment regarding underwater cultural heritage works. This has resulted in a situation where most sports divers have very little knowledge how, or why, they are required by law to treat underwater cultural heritage.

[235] Pers. Comment Kristín Huld Sigurðardóttir 06.12.2012

Finally, the largest problem those interested in increasing underwater cultural heritage protection face at this time is the fact that cultural heritage research is heavily under financed in Iceland at this moment.

8.3 Recommendations for the future of underwater heritage management in Iceland. How to improve?

To improve the status on underwater cultural heritage protection in Iceland, the whole system needs to be reassessed from top and down. First, a political awareness of the situation needs to be established. When it comes to heritage protection on a governmental level all work stands and falls with the understanding of the politicians in charge. When the people in charge do not understand the need to prioritise underwater cultural heritage protection government agencies have little means to enforce the protection. With the support of the politicians in charge both the ministry in charge of heritage protection and the National Heritage Agency will be better suited to develop plans and to enforce the protection.

As the National Heritage Agency is in charge of all cultural heritage protection the agency must begin work on making official protocols regarding underwater cultural heritage protection. Without these the agency is hard pressed in enforcing the laws on the subject. Furthermore the agency should increase awareness regarding underwater cultural heritage. This should of course begin by making sure all district antiquarians are aware of the need to increase underwater cultural heritage protection. Another part of increasing awareness is to make introduction material regarding underwater cultural heritage available to the public. This can either be done by making own material where the Icelandic law is explained with guidelines on how to treat underwater cultural heritage or by making some of the material regarding underwater cultural heritage that has already been made for example by UNESCO and can be found on the organisation's homepage[236]. Another example how this work could be done can be seen with the Danish sports divers union, where the union has a special group where archaeology is the main

[236] http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/divers/ 12.12.2013

focus.[237] This can however not be done without the cooperation of the Icelandic sports divers community.

As mentioned in the beginning of this section, all this work is completely dependent on getting financial support. All this work costs money and without getting the governmental support for these projects it is hard to see how the situation can change.

[237] http://www.sportsdykning.dk/page.php?id=33 12.12.2013

Bibliography

Agnarsdóttir, Anna. "Aldahvörf Og Umbrotatímar." Saga Íslands. Vol. IX. Reykjavík: Hið Íslenzka Bókmenntafélag, 2008. 5-166. Print.

Annálar 1400-1800. *Annales Islandici Posteriorum Sæculorum*. Vol I-III. Hið íslenzka bókmenntafélag, 1933-1938

Arge, Simun V. "Marinarkæologi På Færøerne; Fund, Forvaltning Og Udfordringer."Havets Kulturarv: De Nordiske Maritime Museers Arbejdsmøde I Torshavn, August 2006. Esbjerg: Fiskeri- Og Søfartsmuseets Forlag, 2007. 55-72. Print.

Auer, Jens. Survey Report Ostsee Bereich V, Darss, Fundplatz 17: Report on the Survey of Site FPL 17, Prerow, Mecklenburg-Vorpommern, Germany, Conducted by the Maritime Archaeology Programme of the University of Southern Denmark as Part of the Field School Course in July-August 2009 00. Esbjerg: University of Southern Denmark, Maritime Archaeology Programme, 2010. Print.

Auer, Jens. Prinsessan Hedvig Sophia: Fieldwork Report 2010. Esbjerg: Maritime Archaeology Programme, 2011. Print.

Auer, Jens, and Holger Schweitzer, eds. Prinsessan Hedvig Sophia: Fieldwork Report 2011. Esbjerg: University of Southern Denmark, Maritime Archaeology Programme, 2012. Print.

Bates, C.R., and M.J. Lawrence. "Acoustic Ground Discrimination Techniques for Submerged Archaeological Site Investigations." Marine Technology Society Journal 35.4 (2001): 65-73. Print.

Bates, C. Richard, Martin Dean, Mark Lawrence, and Philip Robertsson. "Geophysical Methods for Wreck-Site Monitoring: The Rapid Archaeological Site Surveying and Evaluation (RASSE) Programe." The International Journal of Nautical Archaeology 40.2 (2011): 404-16. Print.

Benediktsson, Jakob. “Landnám og upphaf alsherjarríkis." Saga Íslands. Vol. I. Reykjavík: Hið Íslenzka Bókmenntafélag, 1974. 155-198. Print.

Bengtsson, Boel. Lillgrund Pilot Project. Rep. no. 21858-1. N.p.: Bohusläns Museum, 2008. Print.

Birgisdóttir, Brynja Björk. Fornleifarannsóknir Og Fornleifavernd á Íslandi 1990-2010. Publication. Reykjavík: Mennta Og Menningarmálaráðuneyti, 2013. Print

Björnsson, Lýður. “18. öldin." Saga Íslands. Vol. VIII. Reykjavík: Hið Íslenzka Bókmenntafélag, 2006. 5-293. Print.

Borssén, Cecilia, ed. Kulturmiljövård under Vatten; En Rapport till Vägledning För Arkeologer Och Handläggare Verksamma Inom Kulturmiljöområdet. N.p.: Riksantikvarieämbetet, 2008. Print.

Bowens, Amanda. Underwater Archaeology: The NAS Guide to Principles and Practice. 2nd ed. Malden, MA: Blackwell Pub., 2009. Print.

Brylske, A. How safe is diving? An Update by Alex Brylske. Dive Training Magazine, 1999 (10).

Church, Robert A., and Daniel J. Warren. "Sound Methods: The Necessity of High-resolution Geophysical Data for Planning Deepwater Archaeological Projects." International Journal of Historical Archaeology 12.2 (2008): 103-19. JSTOR. Web. 26 Nov. 2013.

Delgado J. P., 2000. Underwater Archaeology at the Dawn of the 21st Century. Historical Archaeology, Vol. 34.

Diving Industry Personnel Copetence Standards. Rep. European Diving Technology Committee, Mar. 2003. Web. 12 Dec. 2013. <http:// www.edtc.org/EDTC-CompetenceStandardsAsIssued.pdf>.

Dromgoole, Sarah. Underwater Cultural Heritage and International Law. Cambridge: Cambridge University Press, 2013. Print.

Edvardsson, Ragnar. Fornleifakönnun á Neðansjávarminjum á Völdum Stöðum á Vestfjörðum. Rep. Reykjavík: Fornleifavernd Ríkisins, 2010. Print.

Edvardsson, Ragnar, and Arnar Þór Egilsson. "Archaeological Assessment of Selected Submerged Sites in Vestfirðir." Archaeologica Islandica 9 (2011): 9-28. Print.

Edvardsson, Ragnar, and Arnar Þór Egilsson. *Póstskipið "Phønix"; Rannsóknarskýrsla*. Publication. Unpublished, 2011.

Einarsson, Bjarni F. "Mjaltastúlkan í Gígnum." *Árbók Hins íslenzka Fornleifafélags*. Vol. 90. Reykjavík: Hið íslenzka Fornleifafélag, 1994. 129-48. Print.

Eldjárn, Kristján. *Kuml Og Haugfé úr Heiðnum Sið á Íslandi*. Ed. Adolf Friðriksson. 2nd ed. Reykjavík: Mál Og Menning, 2000. Print.

Þorsteinsson, Björn. "Norska öldin." Saga Íslands. By Guðrún Ása Grímsdóttir. Vol. IV. Reykjavík: Hið Íslenzka Bókmenntafélag, 1989. 61-260. Print.

Grotius, Hugo. The Law of War and Peace. Trans. Jean Barbeyrac. Ed. Richard Tuck. Vol. II. Indianapolis: Liberty Fund, 2005. Print.

Lúðvíksson, Steinar J. Hvað Gerðist á Íslandi 1983. Reykjavík: Örn Og Örlygur, 1984. Print.

Jónsson, Guðmundur, and Magnús S. Magnússon. Hagskinna: Sögulegar Hagtölur Um Ísland = Icelandic Historical Statistics. Reykjavík: Hagstofa Íslands, 1997. Print.

Karlsson, Gunnar. "Frá þjóðveldi Til Konungsríkis." Saga Íslands. Vol. II. Reykjavík: Hið Íslenzka Bókmenntafélag, 1975. 3-56. Print.

Kurson, Robert. Shadow Divers: The True Adventure of Two Americans Who Risked Everything to Solve One of the Last Mysteries of World War II. New York: Random House Trade Paperback, 2005. Print.

Maarleveld, Thijs J. "The 2001 UNESCO-Convention on the Protection of the Underwater Cultural Heritage: Origin and Consequences." Havets Kulturarv: De Nordiske Maritime Museers Arbejdsmøde I Torshavn, August 2006. Esbjerg: Fiskeri- Og Søfartsmuseets Forlag, 2007. 9-32. Print.

Morang, Andew, Robert Larson, and Laurel Gorman. "Monitoring the Coastal Environment; Part III: Geophysical and Research Methods." Journal of Coastal Research 13.4 (1997): 1064-085. JSTOR. Web. 26 Nov. 2013.

Magnúsdóttir, Margrét Björk. Fornleifaskráning á Íslandi: Hlutverk Og Staða. Thesis. University of Iceland, 2009. Reykjavík: University of Iceland, 2009. Print.

Manders, Martijn R., and Christopher J. Underwood, eds. Training Manual for the UNESCO Foundation Course on the Protection and Management of Underwater Cultural Heritage in Asia and the Pacific. Bangkok: UNESCO, 2012. Print

Manders, Martijn R., Christopher J. Underwood, and Erpbrem Vatcharangkul. "Unit 17; Public Archaeology." Training Manual for the UNESCO Foundation Course on the Protection and Management of Underwater Cultural Heritage in Asia and the Pacific. Bangkok: UNESCO, 2012. Print.

Majewski, Teresita, and David R. M. Gaimster. International Handbook of Historical Archaeology. 1st ed. New York: Springer, 2009. Print.

McCharty, Mark. "A Wreck Inpection Programme as an Aid to the Co-ordinated Management of a Large Number of Wreck Sites." The International Journal of Nautical Archaeology 11.1 (1982): 47-52. Print.

Nævestad, Dag. Kulturminner under Vann. Oslo: Norsk Sjøfartsmuseum, 1991. Print.

Ólafsdóttir, Jónína. Köfun á Íslandi; Öryggi Og Umgjörð. Thesis. University of Iceland, 2010. Reykjavík: Háskóli Íslands, 2010. Print.

Pálsson, Lýður. “Framförum miðar hægt 1695-1741.” *Saga Íslands*. Vol. VIII. Reykjavík: Hið Íslenzka Bókmenntafélag, 2006. 67-108. Print.

Staniforth, Mark, and Hans K. Van Tilburg. "Unit 5; Desk-based Assessment." Training Manual for the UNESCO Foundation Course on the Protection and Management of Underwater Cultural Heritage in Asia and the Pacific. Bangkok: UNESCO, 2012. N. pag. Print.

Westrin, Th., ed. Nordisk Familjebok; Konversationslexikon Och Realencyklopedi. Vol. 13. Stockholm: Nordisk Familjeboks Tryckeri, 1910. Print.

Zorich, Zach. "Television: Finding Treasure and Losing History." Archaeology 62.1 (2009): n. pag. Web. 12 Dec. 2013. <http://archive.archaeology.org/0903/trenches/odyssey.html>.

Þorláksson, Helgi. „Hvar er akkeri gullskipsins sem sökk undan ströndum Skeiðarársands?“. Vísindavefurinn 6.9.2000. http://visindavefur.is/?id=881. (Skoðað 13.12.2013).

Þorláksson, Helgi. Saga Íslands. Vol. VI. Reykjavík: Hið Íslenzka Bókmenntafélag, 2003. Print.

Þorláksson, Helgi. “Undir einveldi." Saga Íslands. Vol. VII. Reykjavík: Hið Íslenzka Bókmenntafélag, 2004. 5-214. Print.

Þórarinsson, Sigurður. "Sambúð Lands Og Lýðs í Ellefu Aldir." Saga Íslands. Vol. I. Reykjavík: Hið Íslenzka Bókmenntafélag, 1974. 29-100. Print.

Laws and conventions

European Convention on the Protection of the Archaeological Heritage 1969, Revised 1992

Gamli Sáttmáli 1262

Lag (1988:950) om kulturminnen

Lov 1978-06-09 nr. 50: Lov om kulturminner (kulturminneloven)

Lov 1996-11-29 nr 72: Lov om petroleumsvirksomhet (petroleumsloven)

Lov nr. 473 af 7. Juni 2001, museumsloven med ændringer.

Lög um köfun nr.31/1996

Lög um menningarminjar nr. 80/1012

Lög um verndun fornmenja nr. 40/1907

Løgtingsóg Nr. 92 Frá 21. Desember 2004 um vernd av fornlutum í havinum

Recommendation 848 on the underwater cultural heritage 1978

The “Convention with the long name”: Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property 1970

The “Hague Convention”: Convention for the Protection of Cultural Property in the Event of Armed Conflict 1954, Revised 1999

The “New Delhi Recommendation”: Recommendation on International Principles Applicable to Archaeological Excavations 1956

The “Underwater Convention”: Convention on the Protection of the Underwater Cultural Heritage 2001

The “Valletta Convention”: European Convention on the Protection of the Archaeological Heritage 1992

The “World Heritage Convention”: Convention concerning the Protection of the World Cultural and Natural Heritage 1972

Unidroit Convention on Stolen or Illegally Exported Cultural Objects 1995

United Nations Convention on the Law of the Sea of 10 December 1982

Þjóðminjalög nr. 52/1969

Þjóðminjalög nr. 88/1989

Þjóðminjalög nr. 108/2001

Newspaper Articles

"Ekkert Gull í "Gullskipinu"; Gevers Barón æskir þess Að Hollendingar Fái Að Fylgjast Með Leitinni." Tíminn [Reykjavík] 2 Aug. 1974: 1. Print.

"Gullskipsleitin: Óslar Skeiðarár Segulmældir án árangurs." Morgunblaðið [Reykjavík] 12 Aug. 1988: 52. Print.

"Menn Og Málefni." Morgunblaðið [Reykjavík] 8 Nov. 1960: 5. Print.

"Póstgufuskipið Phönix." Þjóðólfur [Reykjavík] 26 Feb. 1881: 18. Print.

RAX. "Stálþilið Um "gullskipið" Fullgert." Morgunblaðið [Reykjavík] 17 Aug. 1983: 40. Print.

Websites

http://www.archaeology.ie/UnderwaterArchaeology/ taken 11 October 2012

https://www.facebook.com/groups/349045898507592/members/ 05.02.2013

http://www.hafro.is/Sjora/ 27.11.2013

http://www.hafro.is/undir_eng.php?ID=10&REF=2 27.11. 2013

http://holar.is/holarannsoknin/kolkuos/akkeri.html Taken 20.03.2013

http://holar.is/holarannsoknin/kolkuos/hofn.html Taken 20.03.2013

http://holar.is/holarannsoknin/kolkuos/kolkuos.html Taken 20.03.2013

http://holar.is/holarannsoknin/kolkuos/kolkuos-a-19old.html Taken 20.03.2013

https://maps.google.com/maps/ms?msid=205334389293000738940.00047232169b17a8a64e0&msa=0 22.11.2013

http://www.mbl.is/greinasafn/grein/1095311/ Taken 14.03.2013

http://www.mbl.is/greinasafn/grein/707709/?item_num=192&dags=2003-01-09 13.02.2013

http://www.minjastofnun.is/gagnasafn-/kortavefsja/ 10.12.2013

http://www.minjastofnun.is/um-stofnunina/log-og-samthykktir/althjodlegar-samthykktir-og-sattmalar/ taken 10 December 2013

http://www.museumsinthesea.com/ 18.02.2013

http://news.discovery.com/earth/james-cameron-relives-deepest-dive-121206.html 06.12.2013

http://postskipid.wordpress.com/um-felagi%C3%B0/ Taken 20.03.2013

http://www.sjohistoriska.se/en/Cultural-heritage/Marine-archaeology/Wrecks-in-the-Baltic-Sea/ 18.02.2013

http://www.sportsdykning.dk/page.php?id=33 10.02.2013

http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CLT/pdf/UCH%20Commercial%20Exploitation%20versus%20Protection.pdf taken 29 November 2013

http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/2001-convention/ 29 November 2013

Figures

Front page. Photo of porcelain in the wreck of the Postship Phønix. Photo taken from: https://www.facebook.com/photo.php?fbid=4727175214308&set=o.163253600462199&type=3&theater 15.12.2013

2.1 Map of areas of responsibility in Denmark. Taken from: http://www.strandingsmuseum.dk/marin-ark/marin-index.htm 13.11.2013

2.2 Flowchart of the Swedish system of heritage management Taken from: Bengtsson, Boel. Lillgrund Pilot Project. Rep. no. 21858-1. N.p.: Bohusläns Museum, 2008. Print.

7.1 Side Scan Sonar. Taken from http://upload.wikimedia.org/wikipedia/commons/5/5b/Side-scan_sonar.svg 10.12.2013

7.2 Map of the area already mapped by the Marine Research Institute of Iceland. Taken from: http://www.hafro.is/images/flokkar/2012/hafsbotn13.jpg 26.11.2013

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