

Appendix 2: Information provided to participants prior to stakeholder workshops

Appendix 2a: Participant consent form

Ethics reference: 19242

Participant Identification Number for this study:

CONSENT TO PARTICIPATE IN RESEARCH

Title of Project: An assessment of the vulnerability of HMS Trincomalee to climate change hazards

Name of Researcher: Emma Callaghan

Name of Participant:

Please initial/tick box

1. I confirm that I have read the information sheet dated 22/11/2024 (version 1.0) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without being disadvantaged in any way.
I understand that should I withdraw then the information collected will be kept in line with the Research Participant Privacy Notice and that the information I have provided may still be used in the project analysis.

☐
3. I understand that individuals from the University of Lincoln may look at research data collected during the study, to ensure that the study is conducted appropriately. I give permission for these individuals to have access to my research data.

☐
4. I consent to my focus group being recorded using Microsoft Teams for the purposes of transcription. I also consent to direct quotes being used in the write up of the research. I understand the quotes will not be attributed to me and will be anonymised.

☐
5. I would like to receive a summary of the results of the study
Yes No

☐
6. I agree to take part in the above study.

☐

_____ Name of Participant	_____ Date	_____ Signature
_____ Name of Person taking consent	_____ Date	_____ Signature

Appendix 2b: Participant information sheet

Participant Information Sheet/Information about the research

Final version 1.0: 22/11/2024



Title of Study: An assessment of the vulnerability of HMS Trincomalee to climate change

We are inviting you to take part in a research study. Before you decide, it is important that you know why we are doing the study and what is involved. Please read the following information carefully.

What is the purpose of the study?

This research study aims to assess the vulnerability of heritage values held by HMS Trincomalee to climate change hazards, as defined by Historic England. Cultural heritage is vulnerable to climate change in multiple ways, and in order to manage this risk we must first understand what these vulnerabilities are. Heritage institutions and professionals must consider this in the way they care for heritage now, whether that be at site or object level. Recently, Historic England published a vocabulary which aims to make consistent the terminology we use when relating climate change to heritage - specifically the hazards which are faced by heritage. Historic ships like HMS Trincomalee are in a unique position by being exposed to the elements and are made of materials which react to shifting weather and long-term climate. A climate change vulnerability assessment has previously not been performed on a historic vessel in the UK.

The study will investigate future climate predictions for Hartlepool, define the heritage values held by HMS Trincomalee and identify which hazards are most applicable to HMS Trincomalee. The study will include stakeholder workshops to ascertain the heritage values held by the ship, the exposure and sensitivity of these heritage values to the identified hazards, and the adaptive capacity of the both the ship itself and National Museum of the Royal Navy.

Am I eligible to take part?

You are being invited to take part because you are an employee of the National Museum of the Royal Navy responsible for the conservation of HMS Trincomalee and/or are conducting research into the ship. There will be approximately 15 other employees taking part in the study.

Do I have to take part?

Participation is completely voluntary. You should only take part if you want to and choosing not to take part will not disadvantage you in anyway.

What will I be asked to do?

You will be asked to complete an electronic survey via MS Forms prior to taking part in an in-person workshop, held at the site on which you are based (either Portsmouth Historic Dockyard or NMRN Hartlepool). The workshops will a short presentation by the researcher and a subsequent discussion. The questionnaire should take no longer than half an hour to complete, and each workshop will last for fewer than 3 hours. You will be asked for your opinion and knowledge/experience of HMS Trincomalee, the values which she holds and her vulnerability to various climate change hazards. You are not expected to conduct any independent research either prior to or following the stakeholder workshops. Each workshop will be recorded via MS Teams for the purpose of partial transcription, and all data will be anonymised. If any identifying information applicable to the final published material, specific consent will be sought. The research study overall will be concluded by 7th February 2025.

Will I be paid expenses for taking part?

You will not be paid to participate in the study. All requirements will take place during working hours.

What are the possible benefits / risks of taking part?

Participants will benefit from the result of this study, which will be an initial vulnerability assessment for HMS Trincomalee to climate change, a ship which is the responsibility of participants to conserve. Increased levels of knowledge regarding the vulnerability of the ship to climate change will allow for more accurate and comprehensive forward planning, and the vulnerability methodology may contribute to future assessments on other ships in the National Museum of the Royal Navy's collection.

A potential risk to taking part is an increase in climate anxiety. Participants will receive an invitation to leave the study at any time if this occurs and they do not wish to continue.

Will anyone know I have taken part?

The University of Lincoln (UoL) is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly.

The research team will keep your name and contact details confidential and secure. The research team will use this information as needed, to contact you about the research study, and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Certain individuals from UoL may look at your research records to check the accuracy of the research study. The people who analyse the information will not be able to identify you and will not be able to find out your name or contact details.

Participants will not be identifiable in any published research if they do not wish to be.

Where will my data be stored?

The data obtained from the study will be stored securely on the NMRN OneDrive in password protected files. Only the researcher will have access to it. The data from this study *may* be put in an Open Access repository for other researchers to use in future research. If so, responses will be anonymised and any personal data (e.g. contact details) will be removed.

What will happen if I don't want to carry on with the study?

You are free to withdraw at any point from this study, without having to give a reason, by contacting Emma Callaghan.

If you choose to withdraw from the study, we may keep the data that we have already obtained, in accordance with our Research Participant Privacy Notice (see below). To safeguard your rights, we will delete all personal details/use the minimum personally identifiable information possible.

What will happen to the results of the research study?

The study will be written up as part of the Heritage Conservation MA requirement. The results of the study may be put in an Open Access repository for other researchers to use. The results of the study will also be saved to the internal server owned by the National Museum of the Royal Navy.

Who is organising and funding the research?

This research is being organised by Emma Callaghan at the University of Lincoln.

Who has reviewed the study?

All research conducted by the University of Lincoln is looked at by an independent group of people, called a Research Ethics Committee, to protect your rights, dignity and wellbeing. This study has been reviewed and given favourable opinion by a University of Lincoln Research Ethics Committee reference number 19242.

What if there is a problem?

It is very unlikely that this study would cause you any harm. If you have a concern or a complaint about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. The researchers contact details are given at the end of this information sheet.

If you remain unhappy and wish to complain formally, you can make a formal complaint through the University complaints procedure or by contacting ethics@lincoln.ac.uk.

Further information and contact details

Contact details

Researcher:

Emma Callaghan

Student number: 26162368

Work email: emma.callaghan@nmrn.org.uk

University email: 26162368@students.lincoln.ac.uk

Supervisor:

Dr Cathy Daly

University email: CDaly@lincoln.ac.uk

Information compliance

The University of Lincoln is the lead organisation for this study and will be the data controller for this study. This means that we are responsible for looking after your information and using it properly.

The university's **Research Participant Privacy Notice** (<https://ethics.lincoln.ac.uk/research-privacy-notice/>) explains how we will be using information from you in order to undertake this study.

If you feel that we have let you down in relation to your information rights then please contact the Information Compliance Team by email on compliance@lincoln.ac.uk or by post at Information Compliance, Secretariat, University of Lincoln, Brayford Pool, Lincoln, LN6 7TS.

You can also make complaints directly to the Information Commissioner's Office (ICO). The ICO is the independent authority upholding information rights for the UK. Their website is ico.org.uk and their telephone helpline number is 0303 123 1113.

Appendix 2c: Stakeholder questionnaires

N.B: These questionnaires were sent to participants via a link to an MS Forms:

Stakeholder Workshop #1:

Assessing the vulnerability of HMS Trincomalee to climate change hazards

Thank you for agreeing to attend the stakeholder workshop designed to be an initial step in assessing the vulnerability to HMS Trincomalee to climate change hazards. Answers to the following questionnaire will form discussion points within the workshop. Please note that you should answer the following questions using your own knowledge and expertise, and are not expected to conduct independent research prior to completing this form.

N.B: No personal data will be collected as part of this questionnaire.

Heritage Values

The vulnerability assessment will include understanding and measuring the **exposure, sensitivity, and adaptive capacity** of the heritage values which HMS Trincomalee holds to various climate change hazards. The following chart is taken from *HMS Trincomalee and Jackson Dock, Hartlepool: Conservation Management Plan, Part 2: Statement of Significance* (Wessex Archaeology, 2020).

In order to identify and rank the heritage values of HMS Trincomalee, please state whether you **agree** or **disagree** with the significance rating given to each value within the Conservation Management Plan, or if you **don't know**. If you disagree with the rating, please state whether the rating should be higher or lower, in your opinion. The numerical index is provided below.

- 5: exceptional and/or international significance
- 4: considerable significance
- 3: some significance
- 2: little or no significance
- 1: negative or intrusive elements

Heritage Values	Significance	Numerical rating
Archaeological artefact whose fabric retains evidence of its construction, modification, repair and conservation between 1817 and the present day.	Exceptional	5
Only surviving example of an elliptical stern.	Exceptional	5
Technological variation (due to use of teak in the ship's construction).	Exceptional	5
Contribution to the group value of surviving frigates.	Exceptional	5
Association with Bombay shipbuilding establishment.	Exceptional	5
Contribution to wider academic study relating to timber marks.	Considerable	4
Service as an imperial cruiser.	Considerable	4
Refit to corvette configuration in 1840s.	Considerable	4
Survival of associated artefactual and documentary evidence.	Considerable	4
Association with NMRN heritage fleet.	Considerable	4
Value to national and international maritime heritage community.	Considerable	4
Communal value to the people of Hartlepool.	Considerable	4
Aesthetic qualities (stern, curves, paint, masts, yards, rigging etc.)	Considerable	4
Technological innovations.	Some	3
History of timber ship conservation (1840s refit and 1990s restoration)	Some	3

Legibility of ship's hierarchy of status (illustrated by mess deck crew quarters, officer's cabins, and Captain's cabin)	Some	3
Career prior to restoration.	Some	3
Association with Eliza Bunt.	Some	3
Association with artistic figures (e.g. Henry Scott Tuke).	Some	3

Are there any values which you believe are missing from this list? Please state below.

Climate change

You have been provided with a table of climate predictions for Hartlepool by 2100 (data provided by the MET Office), a table of definitions and a Matrix of Impacts. Please refer to these when considering your answer to the following question, along with your own knowledge and experience.

Considering the climate predictions for Hartlepool and your own knowledge and experience, please rank the Climate Impact Drivers from **least concern** to **most concern**.

1	Mean air temperature
2	Mean precipitation
3	Heavy precipitation and pluvial flood
4	Extreme heat
5	Aridity
6	Severe windstorm
7	Frost
8	Mean wind speed

Are there any other climate change hazards which you believe may impact HMS Trincomalee, which are not listed here?

Stakeholder Workshop #2:

Assessing the vulnerability of HMS Trincomalee to climate change hazards

Thank you for agreeing to attend the stakeholder workshop designed to be an initial step in assessing the vulnerability to HMS Trincomalee to climate change hazards. Answers to the following questionnaire will form discussion points within the workshop. Please note that you should answer

the following questions using your own knowledge and expertise, and are not expected to conduct independent research prior to completing this form. You have been provided with information which may assist you via email.

N.B: No personal data will be collected as part of this questionnaire.

Climate Change Hazards

You have been provided with a table of climate predictions for Hartlepool by 2100 (data provided by the MET Office), a table of definitions and a Matrix of Impacts and Confidence Summary. Please refer to these when considering your answer to the following question, along with your own knowledge and experience.

Considering the climate predictions for Hartlepool and your own knowledge and experience, please rank the Climate Impact Drivers from **least concern** to **most concern**.

1	Mean air temperature
2	Mean precipitation
3	Heavy precipitation and pluvial flood
4	Extreme heat
5	Aridity
6	Severe windstorm
7	Frost
8	Mean wind speed

Open Ocean and Coastal

You have been provided with a specific Matrix of Impacts relating to the Climate Impact-Driver categories of 'Open Ocean' and 'Coastal'. Please use this to answer the following question/s. The purpose of this section is to determine whether these categories will form part of the discussion.

The Climate Impact-Drivers ranked in Section 1 have been pre-selected from a wider range as those most relevant to HMS Trincomalee.

Considering Trincomalee's current position in Jackson Dock, are there any Climate Impact-Drivers from the Open Ocean and Coastal Matrix of Impacts which you believe should feature as most relevant to HMS Trincomalee?

- Yes
- No
- More information needed

Which 'Open Ocean' and/or 'Coastal' Climate-Impact Drivers do you believe are relevant to HMS Trincomalee?

- Mean ocean temperatures
- Marine heatwaves
- Ocean acidity
- Ocean salinity
- Dissolved oxygen
- Relative sea level
- Coastal flood
- Coastal erosion

What information, if any, would assist you in answering this question?

Are there any other climate change hazards, or effects of climate change, which you believe may impact HMS Trincomalee, and are not listed here?

Appendix 2d: Matrix of Impacts

(Adapted from Sesana et al., 2021, Daly, 2014, Thomas et al., 2024b, and NHS-UK, 2021c)

Climate Impact Driver and summary of confidence in projected change	Primary Hazards	Example physical impacts on cultural heritage
Mean air temperature <i>High confidence of increase and has already emerged.</i>	Average temperature patterns Average humidity patterns Salt crystallisation cycles Biological growth Species distribution	Biological attack of organic materials by insects, moulds, fungi, and invasive species. Relative humidity cycles/shock causing splitting, cracking, flaking and dusting of materials and surfaces. Physical changes to porous materials and finishes. Crystallisation and dissolution of salts caused by wetting and drying affecting standing structures and decorative finishes. Relative humidity cycles/shock causing splitting, cracking, flaking and dusting of materials and surfaces. Corrosion of metals. Biochemical deterioration.
Extreme heat <i>High confidence of increase and has already emerged.</i>	Rapid humidity fluctuations High temperature events	Deterioration of facades due to thermal stress.
Frost <i>High confidence of decrease.</i>	Freeze-thaw cycle Freeze-thaw events	Frost damage.
Mean precipitation <i>High confidence of increase and high confidence of emergence by 2050.</i>	Average precipitation patterns Average humidity patterns Salt crystallisation cycles	Swelling/drying of hygroscopic materials.
Heavy precipitation and pluvial flood	Heavy precipitation event	Damage due to faulty or inadequate water disposal systems; rainwater goods not capable of handling heavy rain and often difficult to access, maintain, and adjust.

<i>High confidence of increase.</i>		
Aridity	Average humidity patterns Desiccation	Extreme drying of hygroscopic materials, formation of cracks.
<i>High confidence of decrease.</i>		
Mean wind speed	Average wind speed Average wind transportation patterns	Penetrative moisture into porous cultural heritage materials. Static and dynamic loading of historic or archaeological structures. Structural damage and collapse.
<i>Medium confidence of decrease.</i>	Wind-driven rain Average humidity patterns	Deterioration of surfaces due to erosion.
Severe windstorm	Extreme wind speed Heavy precipitation event	Static and dynamic loading of historic or archaeological structures. Structural damage and collapse.
<i>Medium confidence of increase.</i>	Hail Thunderstorm	Penetrative moisture into porous materials.

Appendix 2e: Coastal and Open Ocean Matrix of Impacts

(Adapted from Thomas et al., 2023b)

	Climate Impact Driver	Primary Hazards	Example physical impacts on cultural heritage
Open Ocean	Mean ocean temperatures	Biological growth Water temperature Species distribution	Damage from presence of novel species
	Marine heatwaves	Marine heatwaves Species distribution Biological growth	Damage from presence of novel species
	Ocean acidity	Acidification Biological growth	Corrosion Damage from presence of novel species
	Ocean salinity	Ocean salinity Species distribution Biological growth	Damage from presence of novel species
	Dissolved oxygen	Species distribution Biological growth Low oxygen events Dissolved oxygen	Corrosion Damage from presence of novel species
Coastal	Relative sea level	Sea level rise Storm surge Saltwater incursion	Foreshore lowering Storm damage Salt mobilisation
	Coastal flood	Coastal flooding Saltwater incursion	Corrosion
	Coastal erosion	Coastal erosion Coastal landslide	Exposure or burying of deposits Loss of shorelines

