Managing the Effects of Climate Change on Health and Safety in Archaeological Fieldwork

FAME Advice for Archaeological Practitioners

The FAME Health and Safety Guides are produced by the FAME Health and Safety Working Group to provide advice to its members to foster safe systems of work for development-led archaeological practice. They are not designed to replace existing, detailed guidance available from the Health and Safety Executive (HSE) / Health and Safety Authority (HSA) and other bodies and must always be used in conjunction with that guidance, clearly referenced in each guide, where applicable.

FAME Health and Safety Guide 8: Managing the Effect of Climate Change on Health and Safety in Archaeological Fieldwork

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NOTE: This document will be updated regularly please check the FAME website to get the most recent version.

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Introduction

Climate change is the natural process of warming and cooling of Earth's atmosphere, which has come to define Earth's local, regional and global weather and climates. This natural process of change can be affected by geological and ecological events and their influence over the amount of carbon and other greenhouse gases (GHGs) stored within the planet and its atmosphere. Human actions, however, have (and continue to) added a steady rise in temperature onto the natural variations, which has been termed 'global warming.'

Since the industrial period, human activities are estimated to have increased Earth's global average temperature by about 1 degree Celsius and is currently increasing by more than 0.2 degrees Celsius per decade. The current warming trend is unequivocally the result of human activity and is proceeding at an unprecedented rate when compared to changes measured over millennia (see: https://science.nasa.gov/climate-change/what-is-climate-change/).

On a local level, no one weather event may be conclusively attributed to Global Warming; however, changes to British Isles weather patterns have been observed. Temperatures are predicted to continue to rise until global levels of GHGs are reduced, climate models have been used to predict the effects to future British Isles weather patterns.

The UK Met Office have provided analysis that shows that the British Isles climate is becoming hotter and wetter, with more frequent and higher extremes. Also, climate change will continue to affect the British Isles' weather in the future. When combined with other research, the predicted changes include:

- more frequent periods of hot weather;
- more extremes in hot weather;
- wetter conditions with more frequent extremes in rainfall;
- an increase in rapidly changing conditions (e.g., brief intense hot or cold periods);
- more flooding, including from sea-level rise, storm surges and flash flooding;
- higher risk of land slippage;
- an increase in coastal erosion;

- increased risk of wildfires;
- increased risk of tree fall, either through 'sudden branch drop syndrome' or during storms due to decreased tree health;
- changes in prevalence of insect-borne diseases, as well as expansion of previously unknown diseases; and
- an increase in potential for zoonotic outbreaks and pandemics.

Scope and objectives

Whilst considerable work has already been completed to examine the effect of climate change on various entities, such as the environment, the economy and even archaeological resources, there is no advice available on the impact of climate change on the health and safety of operatives conducting archaeological fieldwork, the category of workers at a higher risk from the effects of climate change due to a greater level of exposure.

This guide is designed to highlight potential hazards/risks that may be encountered of have an impact on archaeological operations, including specialist activities such as walkover surveys, landscape surveys and geoarchaeological investigations. Due to the number of people often involved, this guide will predominantly refer to fieldwork operations; however, in many cases, these will be applicable to other activities as well.

A Live Document

This guide will be different from other FAME H&S guides. It will act as an enabling document and will not explore any one topic in depth. This guide will cover generic mitigations; however detailed guidance on specific topics (such as heat indices) will be published separately and linked to here. The FAME website will host a live version of this document so please check the FAME website for the newest version of this document as it will be updated regularly.

Legal

No one regulation or legal guidance document in the UK or Ireland covers Health and Safety in relation to climate change; however, the Health and Safety at Work Etc. (1974) it and its related legislation such as the Management at Work Regs. 1999, CDM Regs. 22015 and RIDDOR Regs. 2015 should be referred to in the UK.

In Ireland, the Ireland, the Safety, Health and Welfare at Work Act 2005 (as amended) (SHWWA) is the primary legislation and its different regulations e.g. Safety, Health and Welfare at Work (Construction) Regulations (Amended 2021) (SHWWCR).

Potential effects risks and mitigation of climate change of health and safety during archaeological works.

Management Cycle

Following the standard management cycle laid down in the Health and Safety Management at Work Regulations (1999) and across the most used ISO management standards; Plan, Do, Check/Act, the following list details the potential impact at each stage of archaeological works.

Plan

The increasing uncertainty and rapidly changing environmental conditions will need to be carefully considered at the tendering and planning stages of a project. Familiar certainties (e.g., building in additional time to account for safe working in winter months) may have to be reconsidered. Failure to do so may result in increased time pressure during operations, which in turn could lead to additional mental/physical fatigue on the workforce and therefore a higher probability of incidents, injuries, illness and other negative outcomes.

Do – project work

During project work, the same uncertainty and changeability will apply equally, with the key emphasis being on the inability of staff to physically adapt quickly. The impact of climate change will also increase the need for staff to be able to quickly adapt working methods and techniques.

Check/Act – reviewing work and identifying improvements

When reviewing projects with regard to identifying areas for improvement or innovation, the same reliance on assumptions and traditional certainties described above may have to be questioned. Further to this, reviews should be considered against the backdrop of climate change-related issues.

Specific Hazards and Risks

In this section, we will explore some of the potential negative outcomes of climate change and how they could impact archaeological projects.

Adverse/extreme weather and temperature

Climate change will likely increase the number of adverse or extreme weather and temperature events as well as disruption to normal seasonal changes. Effects on archaeological fieldwork include:

- Flooding/saturated ground
- Extreme cold/heat/wet and or dry/ drought conditions
- Damage to local environments/eco-systems
- "Squeezing" of work programmes

These factors, while not creating new risks, could increase the exposure to risks that are already present. This, in turn, will likely see mitigations increase, which in turn could create additional hazards.

For more information on safe working temperatures see FAME's guide on Heat Stress Indices for Safe Archaeological Work

These weather and temperature events may also result in complex interactions with other factors to increase risks. See FAME's guide on Medication Side-Effects: Heat and Sun Sensitivity

Rapid Changes

Sudden and often unpredictable changes, particularly in weather will have a significant impact on archaeological operations due to the additional stressors these place upon organisms, including humans. This in turn, could lead to discomfort and other distractions as a key factor or exacerbating factor in incidents due to difficulties in adapting to changes quickly. These sudden changes also place stress on the environment, the destabilisation of which can also lead to increased incidents

Illness

Increases in global temperatures are linked to the spread of disease (particularly, the spread from equatorial regions to historically colder areas). Archaeologists, due to the larger number of people working and potentially living together for the duration of a project, may have an increased risk. This,

in turn, could lead to understaffing on site and therefore a higher risk of negative events.

Flora/fauna

As with pathogens, increasing temperatures and other climatic changes will increase the spread of non-native and potentially unfamiliar/harmful flora and fauna.

For example, see FAME's guide Archaeology, Lyme Disease & Ticks

Archaeologists, particularly those working in rural areas, may face an increase in exposure to these and any negative outcomes. Additionally, native species of flora and fauna may become more susceptible to disease or be outcompeted. This could lead to a range of negative consequences, for example, trees blowing down or "branch drop".

Ground conditions

With the above-described meteorological changes, there is a higher probability of ground conditions being more difficult to work or potentially changing rapidly (for example, baked dry ground becoming waterlogged or vice versa), leading to a greater potential for musculoskeletal injuries or other injuries relating to ground conditions such as slips, trips and falls.

Variable/limited resources

Off-site climate change may also affect the supply chain's ability to manufacture and transport products, which can lead to limited or variable resources, including PPE, tools and other equipment. As well as a potential increase in costs and therefore financial risk, there is a potential for injury or other incidents.

Transport networks

Rapidly changing conditions will impact local transport networks, for example, additional road degradation. This, in turn, increases the risks to staff travelling to and from sites.

Mitigation

Guidance of specific mitigation measures will be included in further guidance; however, the below includes some generic measures.

Planning – planning for and factoring in the effects of climate change will be essential and could include planning for:

- greater seasonal variation,
- building in additional time to projects to account for anticipated stand downs,
- consideration of site-specific environmental conditions, etc.

Training – greater emphasis on the effects of climate change, mitigation and dynamic risk assessment during the above planning phase and on-site to adapt to rapid changes. Crucially, this would enable and empower workers, who will be best placed, to make sensible risk-based decisions.

Risk Assessment (including on-site dynamic and task-specific risk assessment)

Increased resourcing – specifically for changes to techniques and the adoption of new techniques and solutions, as well as likely general increases in project costs.

Factoring in climate change-related lessons learning during post-project reviews and sharing them across the sector.

Further and Future Guidance

Not all of the hazards, risks and mitigations outlined above are specific to archaeological works, and it is highly recommended that organisations familiarise themselves with standard guidance from trusted sources such as the Health and Safety Executive (HSE)/ Health and Safety Agency or National Health Service (NHS)/ Health Service Executive. Where it is deemed appropriate FAME will provide sector-specific guidance on topics that will be incorporated into this guide.

FAME Health and Safety Guides

Construction (Design and Management) Regulations 2015 (2020)
Safe Working Around Utilities (UK) (2021)
Near-Miss Reporting (2022)
Medication Side-Effects: Heat and Sun Sensitivity (2023)
FAME Utility Guide (UK) (2024)
Archaeology, Lyme Disease & Ticks (2025)
Heat Stress Indices for Safe Archaeological Work (2025)
Fencing and Security of Archaeological Excavations (2026)