

Guidance Sheet No. 7: CURRENT CONDITION & POTENTIAL THREATS

Condition Assessment

An assessment of the current condition of the panel will provide baseline data which will allow future monitoring of decay or damage. It will also identify panels which require immediate protective measures and highlight sites which may be suitable for public access with appropriate management.

Physical and Chemical Weathering

Rock art in England is most commonly carved on sandstone. For these rocks, the main cause of physical or chemical decay is dissolution or alteration of the calcite matrix which cements the geological particles together, generally due to the adverse effects of temperature, water and atmospheric pollutants. These processes result in tiny particles of the rock being lost from the rock surface. **Differential** exposure of certain parts of the rock surface to the weather can lead to deeper granular loss on some surfaces compared to others, creating surface contours that can often look like rock art and may result in water being channeled along specific areas of the rock. Many types of sandstone are naturally laid down in layers (bedding), which makes them susceptible to **planar** weathering. Material is lost due to layers of rock becoming detached from the rock surface along a bedding plane or line of weakness. Surface material is generally lost in sheets, often leaving a rough, differently coloured surface exposed. **Cratering and pitting** is caused when areas of the rock of varying hardness weather at different rates producing uneven, pitted surfaces. **Burnt areas** may be the result of wildfires (extremely destructive) or controlled burning (less damaging) of e.g. heather, as part of land management practices. Intense heat causes the rock to expand and contract leading to cracking and spalling of flakes of stone, and to the absorption of moisture which, due to freeze/thaw action, causes further damage.

Biological Coverage (See also *Guidance Sheet No. 8: Recognising Lichens, Algae and Mosses*)

Biological growths are potentially a problem for rock art, although we do not fully understand how they cause decay. It is likely that different types of biological organisms act in different ways on different types of rock, so in order to understand these relationships we first need to collect information and observe patterns of growth. The main types of biological growths found on carved panels are lichens, mosses, algae, grass, trees and other vegetation. **Lichens** are common on carved rocks. The two main types are **crustose** (lies tightly on the rock surface to give a crust-like covering) and **foliose** (leafy, roughly circular splotches). Several separate species can colonise a single rock surface. They can be different colours and may be hundreds or even thousands of years old and some are. They prefer drier conditions to moss and algae. **Mosses** appear as patches of green, 'furry' growth. They need soil and moisture to grow. The more foliage the moss has, the higher the level of moisture in the stone. **Algae** appear generally as green (or sometimes red, orange or brown) strands or specks. They may look like streaks or stains across the rock surface and can seem 'slimy'. Algae like damp areas and grow best on porous rocks such as sandstone. **Grass and turf** (and heather) embed their roots in the rock. **Detritus**, which may include pine needles, bracken and leaf litter can obscure the panel and may stain the rock surface.

Animal and Human Impact

Animals and humans can cause significant damage to rock art sites both over a short time scale and longer term. This is something we can prevent or mitigate through good management, so we need to record and monitor the impact of these agents. The main types of impact on rock art are from stock and game animals and from human activity. Droppings from stock or game animals may collect on panels (often in cups). These obscure the carvings but are also potentially damaging to the rock surface. **Wear** from rubbing (by stock animals) or trampling (humans or animals) may cause panels to appear worn or polished. In the case of sheep, rubbing may also result in coloured patches where dye marks have transferred to the rock surface. **Chips and scratches** may be caused by stock animals, but may be produced by human activity, either unintentionally (through trampling) or through misguided attempts to 'clean', or even to re-carve the motifs. **Graffiti** may be engraved, scratched, painted or chalked. Initials and dates carved into the rock may be several hundred years old. More recent marks, for example in chalk, may have been used to enhance faint motifs. Although these should not be permanent their temporary presence on the rock surface could affect sensitive dating techniques in the future. Evidence of **quarrying** (which may be very ancient) can be detected in sharp, angular edges to rocks, and the presence of wedge marks. In some examples motifs may be truncated by the removal of blocks of stone. Please indicate in the Condition and Threat Notes whether or not the quarrying is recent. **Plough/flail marks** caused by farm machinery may also be present on the panel.

Potential Threats

Identifying potential threats to rock art panels is very important as it allows heritage managers to take steps to minimise future loss or damage to carvings which may currently be in excellent condition.

Physical/Chemical Threats

Most rock art in England is found on sandstone. For this sedimentary rock, the main cause of physical or chemical decay is dissolution or alteration of the calcite matrix which cements the geological particles together, generally due to the adverse effects of temperature, water and atmospheric pollutants. These processes result in tiny particles of the rock being lost from the rock surface, leading to slow decay or erosion. They are particular threats if the panel is shaped such that **water** is able to **pool** on the surface, or is constantly **flowing** or dripping across it. This results in concentrated dissolution of the surface producing channels or hollows which may look very similar to carved motifs. Physical and chemical weathering may be a particular threat if the panel is located so as to be in the direct path of **prevailing weather** in an exposed location.

Biological Threats

Biological growths are potentially a problem for rock art. They work in different ways to increase the deterioration of the rock surface. The mechanisms by which **lichens** impact the rock surface are the subject of ongoing research. The situation is complex with different lichens acting more aggressively than others on different rock types. They produce very fine roots called 'hyphae' which grow into the tiny pores within the rock. **Mosses** and **algae** tend to retain moisture at the surface of the stone, creating a micro-climate which can be detrimental. **Trees** can form a canopy that traps air and moisture, creating a damp environment and concentrating atmospheric pollutants. This in turn encourages growth of certain biological organisms such as algae. Tree **roots** can be very damaging causing rocks, expanding fissure and breaking apart the rock. Tree and shrub cover also produce **detritus** - leaf litter, pine needles and other decaying vegetation can alter the chemical environment of the rock surface and also trap moisture, both contributing to the dissolution of the calcite matrix. **Note:** Turf cover is not included here as a potential threat as we do not have adequate information about how it affects the rock surface to allow us to make clear decisions about its removal.

Animal & Human Threats

Animals and humans can cause significant damage to rock art sites both over a short time scale and longer term. **Stock animals** can be a problem due to persistent trampling or rubbing the rock surfaces. Cattle are most damaging due to their weight. Animal droppings alter the chemical composition of the rock surface, leading to surface erosion. Sheep droppings are liable to pool in cup marks and rot, but they are less aggressive than cowpats – these kill off all biological organisms on the underlying rock surface and prevent re-growth for a considerable time, which exposes the rock surfaces to the weather. Other problems with stock animals include location of feeding troughs on or near rock art panels. **Game animals** are also potentially problematic. Scattering of quartz granules on carved rocks not only causes physical wear through abrasion, it also encourages grouse to perch on the rocks. Grouse droppings alter the chemical structure of the rock surface. **Land management** activities such as ploughing can cause damage to low-lying or part-buried panels. Rotating chain flail cutters attached to tractors are used to create fire breaks and to harvest heather, and may also result in serious damage. Other activities such as controlled burning, or planting may also present a major risk to panels. If the panel is on or close to a route way, then farm vehicles should also be considered a threat. **People** visiting the panel may be a significant threat to carvings that are well known and/or easily accessible (for example close to an urban area or route way). Specific risks include graffiti, cleaning, trampling, chipping and scratching.