

The use of Unoccupied Aerial Vehicles, or UAVs, is an important tool in peatland restoration. The technology allows us to collect accurate, high-resolution images and data from restoration sites, helping us to improve planning and monitoring of the work we do.



restoring over 1,600 hectares

Pennine PeatLIFE is restoring over 1,600 hectares of blanket bog, working across the protected landscapes of the North Pennines, Yorkshire Dales, Forest of Bowland and Nidderdale. With Pennine PeatLIFE we are also exploring new restoration techniques and demonstrating the viability of practices in the harsh climate of Northern England.

The Pennine PeatLIFE project is being led by the North Pennines AONB Partnership in collaboration with Yorkshire Wildlife Trust and the Forest of Bowland AONB Partnership. The project is co-financed by the Environment Agency, Northumbrian Water, United Utilities, Yorkshire Water and European Union LIFE Programme.



UAVs and peatland restoration

Peninne PeatLIFE delivery partners



Peninne PeatLIFE is funded by



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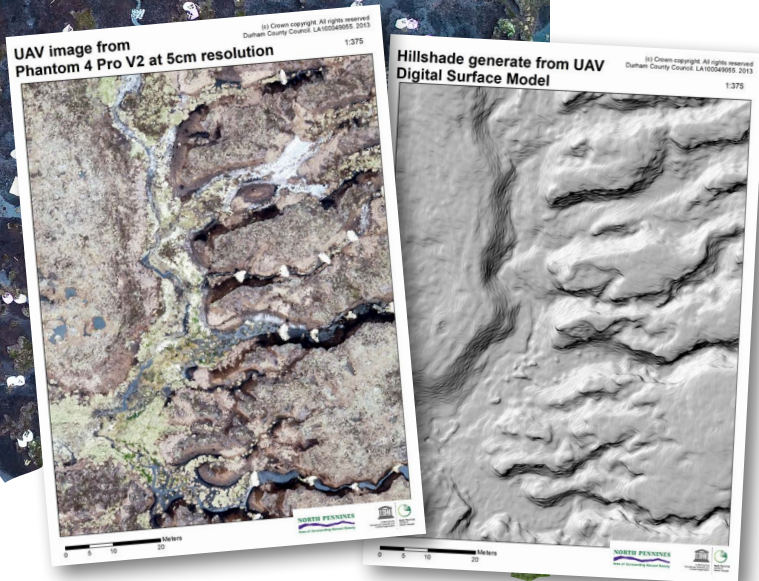
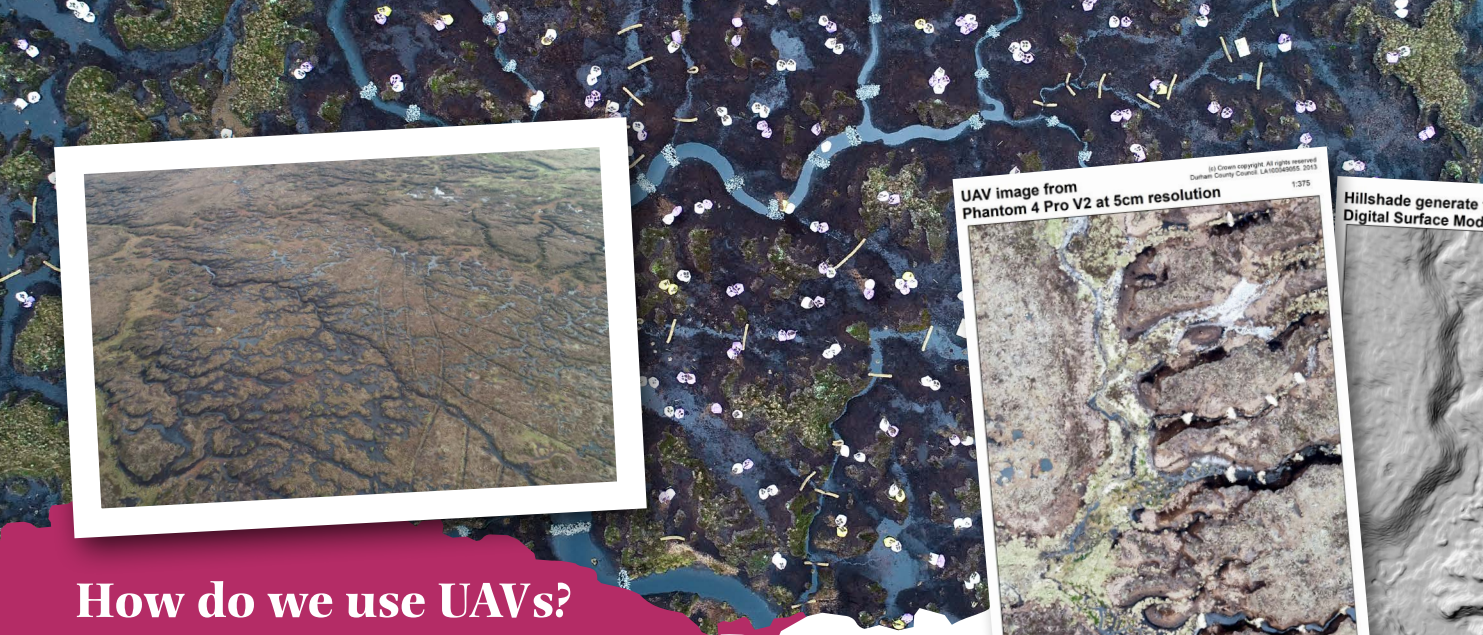
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How do we use UAVs?

Aerial photography

As part of the Pennine PeatLIFE project, UAVs are flown by trained and licensed field staff, following the rules set out by the Civil Aviation Authority. Flight control software is used to plan and carry out automated flights, with UAVs capturing images every few seconds. Images are then pieced together in specialised software to create one large image which can be used in Geographic Information Systems (GIS) for various mapping and monitoring uses.

Using UAV photography, we can:

- capture images of a whole site to centimetre resolution;
- identify features such as drains, gullies and hags, and areas of bare peat, in order to plan restoration works;
- assess how restoration is improving desired outcomes, such as water flow, vegetation cover or reduced erosion; and
- monitor the impact of actions such as brush spreading or sphagnum planting on a particular site.

LiDAR

Alongside photography, UAVs can also collect Light Detection and Ranging (LiDAR) data. LiDAR is a remote sensing tool that uses light from a pulsed laser and a reflection sensor to calculate distances to objects. Attached to a UAV, LiDAR can be used to build 3D digital models of peatlands, for example digital terrain models (DTMs) which are best-estimate models of the Earth's surface. In desk-based surveys, these DTMs can be used to identify peat hags and gullies on site.

LiDAR helps us to:

- create land surface models to identify and quantify areas of erosion such as gullies and hagg edges, including their respective depths and heights;
- identify water flow directions and create digital stream networks, which can then be used to inform decisions about where to install dams and what materials to use; and
- map areas of bare peat.

Multispectral cameras

Used with UAVs, multispectral cameras capture electromagnetic radiation from across the electromagnetic spectrum, not just the visible portion of the spectrum that our eyes capture (red through to green through to blue). It is already used in arable farming to monitor plant health and growth, so methods could be transferred to moorland plants for more in-depth monitoring of bog health and recovery.

What are the limitations of UAVs?

- Weather conditions dictate whether it is safe to fly a UAV and can affect the final output, for example windy conditions leading to image blur
- The datasets collected by UAVs are large and slow to process, requiring high performance computers with large storage capacity
- Battery capacity limits how long a UAV can fly for, so site size must be considered