

EcoDrone surveys
Northern Britain's railways
Network Rail

BIG Biodiversity Challenge Award Category: *Innovation*

Project overview

Instead of traditional walkovers, drone surveys are being used for safe, quick and cost-effective ecological surveys of the railway and surrounding habitat. They are also used as a rapid response option for assessment of high bird nests or potential bat roosts

What were the biodiversity conditions on site, prior to the enhancement?

Ecology surveys have traditionally been carried out by walking the railway lineside, noting and recording habitat. This requires advance planning and additional staff to act as lookouts on busy lines. There is also a risk to staff from slips, trips and falls whilst carrying out the survey as there are many steep and thorny railway embankments requiring habitat assessment. Several days may be required to walk and record biodiversity on long stretches of railway for project risk management

What were the reasons behind this project ?

Network Rail has to make efficient use of taxpayer funding. Traditional ecology railway walkover surveys are time consuming and require significant planning for track access plus additional staff for safety and lookout purposes. The IP Signalling Northern Environment Manager proposed training his ecologist to use a drone for quicker surveys. The drone provides rapid response and visibility of the railway infrastructure plus adjacent land whilst providing a comprehensive habitat biodiversity video record. No planning or protection staff are required and using drones eliminates the need to work at height on cherry pickers for biodiversity assessment of buildings, trees and structures



Surveying for birds nests and bat roosts on bridges and trees



Surveying signal box for bat potential and bird nests

What were the biodiversity measures taken?

Habitat suitability surveys for great crested newts in ponds on third party land. Previously this required timely and expensive third party negotiations with public relations and property teams to gain access. This has often led to wasted trips where access has been assumed or agreed but on arriving on site is refused by over zealous security staff. Unnecessary travel and accommodation expenses are incurred. With a drone, access and visibility can be gained instantly making the task faster and cheaper by eliminating negotiations

Nesting bird checks. Nest activity in very high trees, viaducts or embankments can be difficult to determine from the ground. Using a drone provides conclusive evidence of eggs or chicks in the nest. Moreover this can be done from a distance using the drone camera zoom facility so as not to disturb the birds which is essential when checking Schedule 1 bird nests e.g. peregrines nesting on viaducts

Assessment of buildings, trees and structures for bat roost potential:

Previously this has required surveyors working at height and hiring elevated platform or cherry pickers. Using a drone eliminates the hire cost, work at height risk and any habitat damage from installing access plant. Future modifications will include using a thermal camera on the drone to assess structures, building and trees for confirmation of roosting bats and birds

Lineside habitat surveys : The drone allows surveys to be undertaken in areas which are difficult to reach on foot so that a true mapping assessment and record of biodiversity can be made. Footage is useful for spotting more obvious evidence of protected species in open habitat such as spoil heaps from badger setts.



House martin nest under signal box eaves



Rural line footage

Further information

Additional benefits from using a drone for ecology surveys:

- The drone operator can be safely located off the railway network separated from trains
- The environmental team can respond quicker to urgent ecological requests and obtain rapid definitive video confirmation on biodiversity issues. This also allows quicker implementation of necessary mitigation measures for protected species plus quicker provision of information to conservation bodies
- Using the drone makes the collection of biodiversity data easier
- Using new technology has stimulated demand for ecology surveys and boosted interest in biodiversity from railway workers
- A cost benefit study showed the drone pays for itself after only 5 surveys
- The benefits are easily to show to others on site and the quality of the drone footage is really good
- The drone knows when its batteries are running out and returns itself to base, so it monitors its own fatigue!

Project Team

- Network Rail IP Signalling North Environment team comprising Chris Davis and Mike Bradburn

What was the motivation for carrying out the enhancement?

Chris Davis realised there was a safer, faster and more efficient way to carry out ecology surveys on the railway. He did the research, wrote a cost benefit analysis and convinced the executive team to support purchase and training. It makes best use of ecological expertise, eases collection of biodiversity data and improves mapping of biodiversity on the railway.



Checking access paths for biodiversity



Photo of drone and controller