



**the BIG
Biodiversity
Challenge**
do one thing

Anglian Water: Strategic Pipeline Alliance (SPA) Bexwell to Bury St Edmunds (south)

The Strategic Pipeline Alliance (Anglian Water, Costain, Farrans, Jacobs, Mott MacDonald Bentley)

BIG Biodiversity Challenge Award Category: *Innovation Award*

Project overview

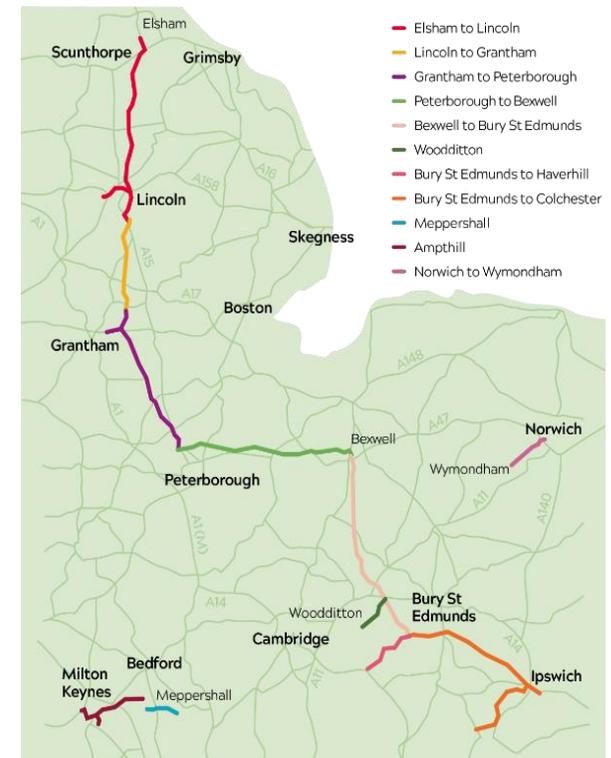
Anglian Water's Strategic Pipeline Alliance (SPA) will create 500km of new water pipelines and is one of the largest infrastructure projects in the UK.

Encouraged by the SPA culture for 'deliberately delivering differently' and application within academic studies, Habitat Suitability Modelling (HSM) was identified as an innovative solution for bat activity surveys.

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

Previous linear projects on this scale (for example HS2) have used traditional survey methods to cover discrete areas, generally focusing effort on the best quality locations along the route. Under that approach no contextual information is provided for the areas outside those surveyed, including those in the surrounding landscape which may connect to important known bat roosts and their Core Sustenance Zone (CSZ).

This project has transformed the academic use of bat HSM (Bellamy, Scott, & Altringham 2013, Brown 2013, Bell 2020) to provide a practical mechanism for identifying key severance locations, which is particularly efficient for large projects.

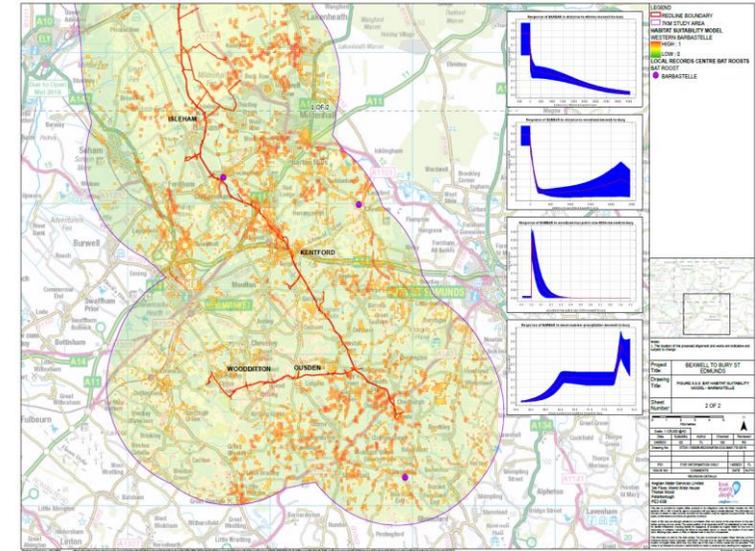


Anglian Water's Strategic Pipeline Alliance plan

What were the reasons behind this project ?

Because of the potential for severance over a large scale it was important to consider impacts well beyond the project’s footprint, especially for mobile species such as bats.

Until now the consideration of ‘off site’ data was generally limited to the identification of wildlife sites where bats are considered or identified as a qualifying feature, known bat roost and in-flight records, and the habitats identified from aerial photographs. While these remain important, the additional use of HSM particularly for large schemes where significant severance may occur should become common practice in the future.



Barbastelle habitat suitability model Bexwell to Bury St Edmunds (south)

What were the biodiversity measures taken?

HSM allows us to further appreciate the role of our assets in the context of the wider countryside. Building on our previous understanding of the connectivity between semi-natural habitats on our own land and the surrounding ecological network, HSM help us pinpoint species-specific land management for bats. HSM was coupled with an extended desk study for bats out to 7km. This allowed the identification of all important known roosts where the CSZ would be affected and was an effective way to identify key connective locations and inform mitigation.

The switch to using static bat detectors rather than transect surveys improved the detectability of quiet bat species. Furthermore, the consideration of the minimum sampling time required to detect the presence of each species was an innovation that allowed the number of sample points to be maximised which is key for HSM.

The use of HSM significantly reduces the amount of field survey required compared to traditional static bat detector and transect surveys. This reduces the number of journeys taken to complete surveys and the number of hotel stays. On SPA the use of HSM reduced the number of site visits by around 50-65%. Fewer visits lowers carbon emissions and reduces the health and safety risk for ecologists driving fewer miles. HSM reduces high survey-season workload, and unsociable hours, which can make the sector off-putting for some. It has proved more cost-effective, helping to keep customer's bills down.

Open-source software (R) and freely available data were used to produce all environmental data used in the modelling. The presence records were generated using equipment/software already in widespread use for bat surveys, and the modelling work utilises the free software such as MaxEnt. With knowledge of MaxEnt, R, and a basic GIS package this process is fully replicable.



Plan showing the location of roosts affected by European Protected Species Licences and their associated CSZs



Jacobs ecologist conducting a tree roost assessment survey

What was the motivation for carrying out the enhancement?

The key challenge for SPA was ensuring a practical survey approach that delivered a robust baseline at a proportionate cost to customers. The SPA culture challenges its staff to work 'deliberately delivering differently'. A traditional approach would have resulted in abortive work and gaps within the baseline due to the iterative design process. The application of HSM at a landscape scale allowed the assessment of reroutes without undermining the validity of the baseline. At Jacobs, we seek to inspire and fund innovative ideas, practice a structured approach to accelerate value creation and delivery whilst empowering our staff to think differently.



Jacobs Ecologist handling a common pipistrelle (*Pipistrellus pipistrellus*)

Further information

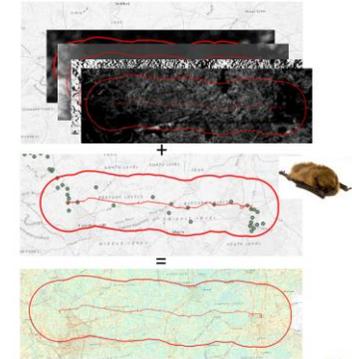
HSM has demonstrated significant effectiveness for the SPA project. Its application should help our schemes to achieve consent, and the novel methodology has been accepted by our expert stakeholders. The Bexwell to Bury St Edmunds scheme has been reviewed by the LPA who have not raised any concerns about the use of HSM within the application. The planning ecologists for the LPAs in the vicinity of other SPA schemes are engaged with the use of this methodology following initial discussions in advance of the submission of planning applications. The project licence, including bats, is due to be issued by Natural England imminently after successful discussion with the regulator over the usefulness of the technique.

SPA's application of HSM provides a significant practical application of the approach, which has been used to engage Natural England and local planning authorities. SPA's experience has already been shared with interested parties. It is a welcome contribution to innovation and progress in the sector.

The idea of using HSM for bats commercially was shared at the North of England Bat Conference. Greg Slack presented on the ongoing HSM work for the project together with Robert Bell from South Yorkshire Bat Group who presented on its use by the bat group to model suitable bat habitat in the area around Sheffield.

How HSM Works

What is Habitat Suitability Modelling?

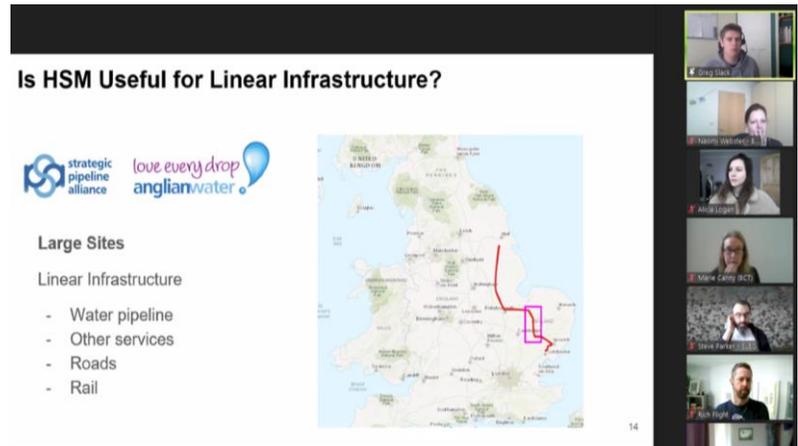


Bell, R. (2020) Sheffield Habitat Suitability Modelling Project: The City's Use By Feeding Bats. British Island Bats. Vol 1, pp. 67-83 https://cdn.bats.org.uk/pdf/Resources/Bat-Groups/Accessing-journals/BritishIslandsBats_VolOne_2020.pdf?mtime=20200626213941&local=none

Bellamy, C., Scott, C. & Altringham, J. (2013) Multiscale, presence-only habitat suitability models: fine-resolution maps for eight bat species. Journal of Applied Ecology, 50(4), pp. 892-901.



Local Planning Authority Ecologist HSM Presentation Slide.



Is HSM Useful for Linear Infrastructure?

Large Sites

Linear Infrastructure

- Water pipeline
- Other services
- Roads
- Rail

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Greg Slack presenting on the SPA HSM work in the presentation titled: Habitat Suitability Modelling – Two Ways.