Incorporating Green Infrastructure in the Worcestershire County Urban Habitat Action Plan

Katherine Pelissari
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Worcestershire County Urban Habitat Action Plan

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Submitted by
Katherine Pelissari

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Rebecca Lashley, Worcestershire County Council

Project Advisor
Professor Robert Krueger

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Executive Summary

1.1 Introduction

This project contributed to Worcestershire’s Biodiversity Action Plan review process by demonstrating how green infrastructure (GI) can be identified and delivered in the Urban Habitat Action Plan. GI provides multifunctional benefits, which help encourage biodiversity through a wide network of green spaces and corridors in urban and natural environments. It is crucial that biodiversity is conserved and sustainably managed for future generations because it provides direct and indirect services for people.

This executive summary will give a brief history of the conservation efforts beginning in 1992 with the Convention on Biological Diversity and the new movement of biodiversity action plans post the Nagoya Protocol in 2010, discuss Worcestershire County’s actions towards conservation at the local level, my methods and objective of this project, and the results and conclusions of creating species population maps in relationship to urban areas in Worcestershire County.

1.2 Background

Caroline Spelman, the UK’s Secretary of State for Environment, Food and Rural Affairs, wrote, “Biodiversity is key to the survival of life on Earth. Its loss deprives future generation of irreplaceable genetic information and compromises sustainability”. Biodiversity is the wide range and variety of living organisms across all habitats including but not limited to terrestrial, marine and aquatic ecosystems; it also includes the complexities and interactions between species and their habitats and ecosystems (GreenFacts, 2001-2017).

Ecosystem services provide direct and indirect amenities that contribute to the well-being, survival, and quality of life of humans (Biodiversity Information System for Europe, 2018). Figure 1 is a breakdown of the categories of ecosystem services and examples.

Unfortunately, recently urbanization, technological advanced, and globalization have negatively affected these services and the biodiversity related to them (HM Government, 2011). Along with ecosystem services, biodiversity can positively impact the health and well-being of humans, so it is vital that we continue to make an effort to conserve and protect all it offers through the implementation of national plans, policies, strategies, and local conservation organizations (UK National Ecosystem Assessment, 2011).
To address the importance of biodiversity, genetic resources, and the decline of both, the Convention on Biological Diversity (CBD), enacted in 1993, set three objectives: 1) the conservation of biological diversity; 2) the sustainable use of the components of biological diversity; 3) the fair and equitable sharing of the benefits arising from the utilization of genetic resources (Convention on Biological Diversity, Introduction, 2018). The convention was signed by 168 parties who agreed that “Earth’s biological resources are vital” and therefore agreed with the objectives of the convention (Convention on Biological Diversity, History of the Convention, 2018). In 2010, the Conference of the Parties, adopted a revised and updated the Strategic Plan for Biodiversity for the 2011-2020 period in which the Parties agreed to cross-over this framework into revised and updated national biodiversity strategies and action plans (Convention on Biological Diversity, Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets, 2018). The new strategies and plans focused on achieving the targets set forward by the Aichi Biodiversity Targets.

Furthermore, in 2010, 189 countries attended the Nagoya Protocol (Department for Environment Food and Rural Affairs, 2011). The Nagoya protocol aimed to layout the legal framework required to implement one of the CBD’s three objectives – “the fair and equitable sharing of benefits arising out of the utilization of genetic resources” – and contribute towards managing and conserving biodiversity (Convention on Biological Diversity, About the Nagoya Protocol, 2018). The protocol was a supplementary agreement by all who signed the protocol to help achieve the CBD’s objective. It incentivized conserving and sustainably using genetic resources, or biodiversity, to enhance new, developing biodiversity and human well-being.

After the Nagoya Protocol, the United Kingdom (UK) updated and published a new strategy for biodiversity called the UK Post-2010 Biodiversity Framework, in 2012. The new plan focuses on managing the environment and including its value in decision making, as the environment has been undervalued over the years (UK National Ecosystem Assessment, 2011). By focusing on the benefits humans get from biodiversity, and understanding the economic, social and health values of it, the UK intends to work towards the goals of the Nagoya Protocol and begin to reverse biodiversity loss.

England, a member of the UK, also developed the Biodiversity 2020: A strategy for England’s wildlife and ecosystem services, published in 2011 (Department for Environment Food and Rural Affairs, 2011). This Biodiversity strategy combines research from The Natural Choice – the first Natural White Paper which placed the value of nature at the center of decision making (HM Government, 2011) – published 2011, and the commitments made at the Nagoya Protocol to develop a strategy document with the Government’s vision and mission. The mission set forward by this strategy is:

> “to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people”

(Department for Environment Food and Rural Affairs, 2011).

These efforts to conserve the biodiversity throughout England and the rest of the UK are supported by the National Ecosystem Assessment, published in 2011. This report intended to:
1. Produce an independent and peer-reviewed the assessment of the state and value of the UK’s natural environment and ecosystem services;
2. Identify and understand what has driven change observed in the natural environment and the services it has provided over the last 60 years, and what may drive change in the future;
3. Foster better interdisciplinary cooperation between natural and social scientists to assist in strengthening policy making, to ensure effective management of the environment and ecosystem services in the future;
4. Ensure full stakeholder participation and encourage different stakeholders and communities to interact;
5. Use the key messages from the assessment to raise awareness amongst society of the importance of the natural environment to human well-being and economic prosperity (UK National Ecosystem Assessment, 2011).

The National Ecosystem Assessment was a milestone for the UK because it acknowledged the significance of declining biodiversity and that “new, more resilient ways of managing our ecosystems” were needed to improve future ecosystems, ecosystem services, and human well-being (UK National Ecosystem Assessment, 2011). The report also addressed the change in public attitudes. More people are becoming aware of environmental issues and as a result there is an increased membership of conservation organisations, such as the Duckworth Worcestershire Trust, based in Worcester, England; there are 45 Wildlife Trusts in the UK (UK National Ecosystem Assessment, 2011).

1.2.1 Worcestershire Conservation

Worcestershire County developed its first BAP in 1999 and reviewed it again in 2008. A Dictionary of Environment and Conservation defines BAP as a “national plan, programme, or strategy for the conservation and sustainable use of biological diversity, drawn up in response to the United Nations Framework Convention on Biological Diversity” (Park & Allaby, 2017). The BAP includes many of the same targeted species and habitats as the National BAP but focuses on targeted species and habitats of particular conservation importance within Worcestershire County. The Worcestershire BAP includes 47 individual habitat and species Action Plans. More specifically, there are 19 habitat, 25 species, and 3 generic action plans. The Urban Habitat Action Plan (HAP) is one plan of this overall arching document and is the focus of this project. Each action plan has its own vision and set of objectives that cover the “current status of the habitat or species within the county, identifies particular threats to it and current areas of work or activity being undertaken by partner organisations” (Worcestershire County Council, Biodiversity Action Plan, 2018). The 2008 BAP is currently undergoing another review process. The Worcestershire County Council, along with the Worcestershire Wildlife Trust and other partners, are planning on updating the BAP to include a more integrated approach to conservation and management by incorporating green infrastructure. The Worcestershire BAP is a local plan that mirror and reinforces the national strategy and action plans.

1.3 Methodology

This project assisted the Worcester County Council begin a yearlong review process of the Worcestershire Biodiversity Action. The aim was to incorporate green infrastructure into the Urban
Habitat Action Plan (HAP) to promote and enhance biodiversity throughout Worcestershire County. The objectives of the project are as follows:

- Research and establish what is green infrastructure and why it is important;
- Review current policies and strategy documents;
- Determine where there is existing green infrastructure and where green infrastructures need to be included;
- Develop objectives for the new HAP;
- Create species population maps that represent areas of importance and support GI

1.3.1 What is Green Infrastructure?

The first objective of this project was to research GI. This concept was new, so gathering a basic understanding was necessary for determining what to include in the HAP. I compiled an understanding of GI and its significance from the Worcester Green Infrastructure Strategy (2013), and Koc’s, Osmond’s, and Peter’s journal, A Green Infrastructure Typology Matrix to Support Urban Microclimate Studies (2016). I included a comprehensive definition of GI in the introduction of the HAP and added a new section that discussed the typologies of GI.

1.3.2 Current Policies and Strategies and Incorporating a GI Strategy

The second and third objectives of this project were to review the current polices and strategies relating to biodiversity conservation at the national, county, and local levels and determine where there is existing GI and where GI needs to be included. I reviewed each document and focused on any reference to urban species, protected habitats, and plans for incorporating GI. The following documents are a sample of what were reviewed:

- Worcestershire Green Infrastructure Strategy (2013)
- Green Infrastructure Guidance (2009)
- Urban Habitat Action Plan (2008)
- Slow-worm Species Action Plan (2008)
- Bat Species Action Plan (2008)

Other research included reading local development plans for each district in Worcestershire, descriptions of important sites of the targeted species, and factors that affect habitats and species from the previous Urban HAP.
1.3.3 Species Populations and Areas of Importance

The fifth objective of the project was to develop species population maps using a geographic information systems (GIS) software called MapInfo. The Worcestershire Biological Records Center (WBRC) provided the last twenty years of data on six different targeted species, determined based on their ability to adapt to urban areas – water voles, pipistrellus spp., great crested newt, slow-worm, hedgehog, and house sparrows. Species population maps were provided as a visual representation of where the species were spotted. A zoomed in portion of the map also showed the densest population of species or an area of significance. Figure 2 shows the step by step process of creating each species population map.

1.4 Results

Along with a finished new Urban Habitat Action Plan, I created species population maps to analyze a possible correlation between siting’s of the urban species and urban areas. The maps will also help showcase areas in Worcestershire where incorporating GI will be most important. Figure 3 is the species population map of water voles.
1.4.1 Water Voles

Based on the map the largest population of water voles is found in Bromsgrove and along a river to the east of the town. This shows that the town should place a higher value on GI to protect the population of water voles.

In fact, the Battlefield Brook, which runs through Sanders Park in Bromsgrove is currently undergoing a restoration project to improve the ecology of the brook and create a more natural environment in the park. The canal, which was made of concrete, can positively be impacted by GI.

![Water Vole Colonies](image)

*Figure 3 Water vole colonies in Worcestershire. Data from WBRC (2018)*

1.4.2 Great Crested Newts

The next map, figure 4, shows the species population of Great Crested Newts. From the map, I zoomed in on a local nature reserve which had a cluster of newts. This reserve could benefit from GI by incorporating more corridors for the species to utilize. The corridors would allow the species to migrate freely between different habitats and encourage an increase in the population. Other siting’s of great
crested newts are scattered around the county, which lead me to think that the populations are isolated. GI will aid in connecting these isolated populations.

1.4.3 European Hedgehog

Figure 5 is the species population map of the European Hedgehog, or just Hedgehog. It is evident that the majority of hedgehog siting’s are in urban towns. The zoomed in picture depicts more siting’s of
hedgehogs in allotments in Worcester City. Allotments are a type of GI and support the benefits of incorporating GI into urban areas.

**Hedgehog Colonies**

*Figure 5 European Hedgehog colonies in Worcestershire. Data from WBRC (2018)*

1.4.4 House Sparrow

Figure 6 depicts House Sparrow colonies in Worcestershire. The large map shows few colonies outside of Worcester City, Malvern, and south of Malvern. House Sparrows depend on insects for food
and places such as hedges and building crevices to nest. Since these bids have adapted to urban towns, it is important to include GI, such as parks, gardens, and hedges for the survival of the populations. Part of the conservation efforts from the Duckworth Worcestershire Trust, focused on hedge laying on a local nature reserve in Worcester, which House Sparrows will benefit from as well as other species.

Figure 6 House Sparrow colonies in Worcestershire. Data from WBRC (2018)
1.4.5 Pipistrellus spp.

It was difficult to draw conclusions from the map of Pipistrellus spp. colonies (Figure 7). The data extrapolated included any bat in the Pipistrellus species, so the map shows more siting’s than any other species map. Though, there do seem to be more colonies in the western half of the county.

*Figure 7 Pipistrellus spp. colonies in Worcestershire. Data from WBRC (2018)*
1.4.6 Slow-worms

Figure 8 shows Slow-worm colonies in Worcestershire. Slow-worms greatly resemble snakes which make them susceptible to being killed if spotted in gardens. Incorporating GI, such as rotted wood, garden, and semi-open habitats in urban towns will help encourage slow-worm populations. An area I noticed with many siting’s of slow-worms was just north-west of Bewdley. This area should be documented as an important habitat for slow-worms and monitored for any fluctuations in the population. There also seem to be isolated populations of slow-worms. Incorporating more green corridors might help connect some of these isolated areas and increase the Slow-worm population in Worcestershire.

Figure 8 Slow-worm colonies in Worcestershire. Data from WBRC (2018)
1.5 Conclusion

Since 2010, there has been a new global push for the conservation and management of biodiversity. Countries around the world have recognized the importance of biodiversity and ecosystem services to the well-being and quality of life of people. As a result, biodiversity strategies have been published and implemented at varying scales – global, national, and local. Worcestershire, a West Midlands County in England, is actively engaged in this movement as they plan to review the county Biodiversity Action Plan to adhere to what the National Strategies are implementing. One strategy includes incorporating green infrastructure in urban developments.

Green infrastructure (GI) is a “network of multi-functional green space, both new and existing, both rural and urban, which supports the natural and ecological processes and it is integral to the health and quality of like of sustainable communities” (British Parliament, 2008). It is particularly important because it is multifunctional, meaning it offers multiple benefits – economic, health, and social (Worcestershire Green Infrastructure Partnership, 2013). GI has the potential to play a critical role in the conservation and preservation of habitats, as well as encourage species who have adapted to urban areas of Worcestershire, such as Water Voles, Great Crested Newts, House Sparrows, European Hedgehogs, Slow-worms, and Pipistrellus spp. of bats.

This project is part of an ongoing review process of the Worcestershire Biodiversity Action Plan. The review is being coordinated by Worcestershire County Council on behalf of the Worcestershire Biodiversity Partnership. Throughout the remainder of 2018, a series of workshops will be held for partners to review the various action plans and revise the aims and objectives of each for the period 2018-2027. The final Urban HAP will serve as a guide for incorporating GI into the other action plans. I also recommend collecting future data on GI and developing map layers to compare species populations with GI throughout that county. These maps may provide more information on the correlation between GI and urban species.