POLLI:NATION

Evaluation Report

March 2019

Learning through Landscapes

heritage lottery fund

LOTTERY FUNDED

This is a partnership project with: Learning through Landscapes, Buglife, Butterfly Conservation, Field Studies Council, OPAL, University of Stirling, TCV and the Bumblebee Conservation Trust

Contents Page

Introduction

Polli:Nation has been a three year project managed by Learning through Landscapes (LtL) and running in over 250 schools across the UK.

With the dual aims of:

- Effecting culture change by engaging and enthusing children and young people to protect pollinating insects
- Increasing the abundance and diversity of pollinating insects in school grounds and local community spaces

The project brought together partners with a range of complementary experience and knowledge to develop and deliver a project in primary, secondary and special schools across the UK.

There are a number of sources of information in this evaluation document:

Extracts from the University of Stirling Evaluation Report, the Survey scientific analysis report, from the quarterly and final reports from facilitators and from a survey sent out to schools about the project. Finally a 'lesson learned' document was run throughout the project which members of the project team added to as we progressed. All have been quoted directly in this report and the findings brought together in a summary of what went well and what could have been improved.

I've learned about what an important job bees do, and I didn't even know that if bees didn't do their job, or just didn't want to do it, or we just get rid of them, then we wouldn't have any honey, we wouldn't have any chocolate, we wouldn't have any vegetables…'

Year 5 pupil, Scotland

Project partners:

- *Learning through Landscapes*
- *OPAL*
- *FSC*
- *Butterfly Conservation*
- *Buglife*
- *TCV*
- *Bumblebee Conservation Trust*

Others taking part:

- *14 LtL accredited professionals*
- *260 schools started the project*
- *254 schools completed all key parts of the project*
- *271 schools were involved in some way*
- *35, 721 pupils took part*
- *7,800 pupils were intensively or regularly involved*
- *2,185 adults were involved in the project*
- Volunteer hours worth at least £309,075 (around 22,610 hours) were recorded
- More then35,200 square metres of land were changed

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Executive Summary

Led by Learning through Landscapes, supported by a steering group of scientific and environmental organisations, the project has engaged over 35,000 children and young people in more than 250 schools across the UK as they have learnt about the importance of pollinating insects in the world today.

Pupils have been supported by LtL facilitators, schools staff, parents, experts and other volunteers as they have surveyed their school grounds for pollinating insects, planned how they could change their grounds for the benefit of those insects then created habitats and food sources to encourage more to visit their grounds.

They have created meadows, bug hotels, orchards, growing areas, planters and more – all to encourage more pollinating insects into their grounds.

At the end of the project they resurveyed their grounds and uploaded their findings to the OPAL website. Partner organisations analysed the data and found that they had been successful – there are now more pollinating insects in the projects school grounds!

We will leave behind resources for schools to use, a webinar to watch and maintenance guides so that they can continue to make their grounds pollinator-friendly.

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What we planned to do

Initial project summary –
as presented in our application.

‘Free’ pollination by bees and other insects is worth over £400m to UK agriculture each year (UK National Ecosystem Assessment, 2011) and is crucial to the maintenance of our natural heritage by pollinating insects in severe decline. The Polli:Nation project will engage pupils, teachers and volunteers in 260 schools across the UK to transform school grounds and local communities into pollinator-friendly habitats.

Pupils will develop their natural heritage recording skills and collect data about pollinating insects. This cross-curriculum secondary and primary school project will give pupils direct hands-on experiences; from creating vertical green walls and chalk grassland banks to lobbying for changes in school maintenance regimes and debating pesticide use.

Pupils will learn about the role pollinating insects play in ecosystem services and be able to apply it to the choices they make and the actions they take.

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What we planned to do

Inputs

Project partners and roles were:

- Learning through Landscapes (LtL) – Project management and facilitation with schools. Chair of project board.
- OPen Air Laboratories (OPAL) *– Development and administration of Polli:Nation survey. Project board member.
- Butterfly Conservation * – Lead on survey data analysis and project board member.
- Buglife * – Survey data analysis and project board member.
- The Conservation Volunteers (TCV) – lead on volunteer development and project board member.
- Field Studies Council (FSC) – Design and production of survey resources and project board member.
- The University of Stirling - Project Evaluation – focusing citizen science in schools
- The Bumblebee Conservation Trust *

* - indicates partners who worked on the development and design of the survey used throughout the project.

'Bees used to be one of my worst fears, but now they're one of my favourite things'

Year 8 pupil, England

We used LtL Project Officers and network of accredited professionals to facilitate the work on the ground in schools. Each was to run a series of workshops within school clusters, four schools being in a cluster. Each facilitator was contracted for just over 13 days support for each cluster.

In the workshops schools would learn about the importance of pollinating insects to food security and ecosystem services. They would learn how to identify different groups of pollinating insects and how to carry out a survey in their school grounds of those insects. Pupils and teachers would then learn about the habitat and food sources needed to support the different insects and would change their grounds accordingly. They would finish the project with a second survey and the data analysed to see what difference had been made.

Project partners would undertake two evaluations of the project: The University of Stirling would not work directly on the project and would undertake their evaluation with schools on the success of the project in practice whilst conservation project partners would undertake scientific analysis of the data gathered by schools which was uploaded onto the OPAL website.

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What we planned to do

Inputs (cont.)

Finances

We received a grant of £1,389,100 with a match contribution of £536,614 giving a full project budget of £1,925,714.

In-kind support

Our aim was to engage volunteers to help schools across the UK – and we looked to achieve a total value of £313,425 of volunteer time on the project. These volunteers were expected to be staff and pupils working on the project outside of lesson times, eg at after school clubs, parents and other local community members with some expertise they could share with the schools such as gardening, ecology or bee-keeping.

We also committed to contributing £222,119 non cash match funding from project partners. This included LtL CPD membership for all schools on the project for three years, input from partners including presentations at events and helping write and review documents as well as financial and administrative support from LtL.

A final £70 of cash was also to be found.

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What happened on the ground

Polli:Nation was led by Learning through Landscapes with an expert board (or steering group – see back page) which met every six months to ensure the project was heading in the right direction and providing knowledge and expertise throughout the project.

Reporting directly to the LtL Project Manager were four LtL Project Officers – one based in each of the four nations – who worked directly with groups of schools whilst also directly co-ordinating other facilitators working on the project. These facilitators are LtL trained and accredited and had specific training on the project at its start. They were supported by their project officers through regular video conference meetings and email or telephone conversations.

Schools applied to the project in clusters of four schools – some already worked closely together, for others this was a totally new partnership.

Facilitators ran a series of workshops with schools as they went through the project. All schools undertook a survey of the pollinating insect in their grounds at the start of the project then half progressed their work in the following year with the other half undertaking their work the year after that. At the end of the project all schools planned to undertake a second survey to see if there had been an increase in pollinating insects in their grounds, or local spaces.

The breakdown of schools recruited across the UK was;

	England	Scotland	Wales	Norther Ireland
Primary	101	46	29	27
Secondary	24	9	4	4
Other	11	4	0	1
Total	136	59	33	32
Grand Total	**260**			

Schools chose a lead school within the cluster and shared an implementation budget of £3,200 between the cluster. This budget was to enable them to make changes to their grounds, or a nearby space, for the benefit of pollinating insects.

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What happened on the ground

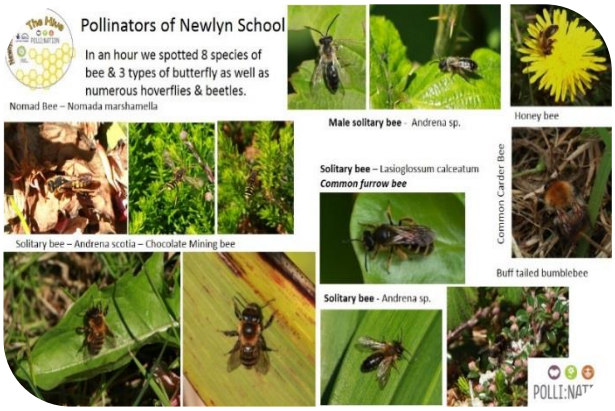
Workshops in schools

Facilitators ran a series of workshops in schools taking staff and pupils through the different stages of the project, teaching them new skills and knowledge and helping them to access further information and plan their projects. They also helped with practical implementation and reporting on the project.

<u>Getting started</u>

At the start of the project, through activities and presentations, pupils learnt about the importance of pollinating insects and how they pollinate plants.

Pupils then surveyed their patch – most of these being within school grounds. Measuring out a 10m x 10m area they then focused on 1m x 1m quadrats, watching to see which insects visited that space within a two minute period. They also collected information about weather conditions (pollinators liking warm weather) and information about the plants already growing in their grounds. This data was then uploaded to the OPAL website for analysis.



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What happened on the ground

Learning about pollinating insects

Insects were identified within groups – to make the survey less complicated for schools to do. The eight different groups being; butterflies, moths, bumblebees, honey bees, solitary bees, beetles, hoverflies and other flies. In addition there were 12 'quest' species that schools could look out for, these being insects that are good indicators of a pollinator-friendly site. Some schools added to this survey work. For example one school had an ecologist parent who brought moth traps into the grounds.

Clusters were then divided into two groups, two schools from each cluster working in year one and two working in year two. Each pair of schools followed the same process – learning about different pollinating insects and what habitats and food sources they needed to thrive.

Pupils learnt about these plants and chose which they wanted to grow and where they wanted to plant these in their grounds. They created plans and models of their grounds and planned the changes. One of the most popular resources created for the project were pollinator friendly plant cards – which provided information about plants, where they could be planted and when they were in flower, thus providing a sources of food for as long as possible throughout the year.

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What happened on the ground

Making changes to the sites

Once plans had been drawn up and decisions made the schools got on with the work on the ground. This included planting trees, shrubs and flowers, leaving grass to grow long or developing meadows, making bug hotels or creating school allotments.

Many schools had lots of volunteers to help them at this stage including the schools in Birmingham. They were supported by TCV who brought in volunteers from local businesses. TCV also wrote a guide for schools about engaging volunteers and this was available on the project website.

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What happened on the ground

Making changes to the sites

More examples of changes by schools.

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What happened on the ground

Post project survey

Once all the changes were made, and in the final year of the project, schools repeated their surveys.

The results of the surveys can be found from page 24 to page 28 of this report.

Additional outputs from schools

Many schools created displays about the project – thus sharing what they have done with their whole school and with visitors to the school.

What happened on the ground

Art in schools

Art work by individual pupils and by classes and whole schools – including some of the teachers – was a popular add-on to projects.

The 'Art with a message' competition in the middle of the project produced some great entries from nurseries through to secondary schools.

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What happened on the ground

Other activities in schools

Some schools have been holding assemblies and events for the wider school community.

A few schools have started keeping bees; (not the one above!)

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What happened on the ground

Other outcomes

At one school ground staff, not knowing about the project, mowed away clover - a food source for their pollinating insects. In response a maintenance guide has been produced to address this issue.

Whilst in another school some visitors (wild bees) to the school were spotted and studied thanks to the project.

Many pupils have been taking part in lessons and clubs where Polli:Nation has been the focus, often with a local expert coming in to help.

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University of Stirling Evaluation

Methodology (Extracts taken directly Polli:Nation, An Educational Evaluation by Andy Ruck from the University of Stirling)

The findings in this report have been gathered using the following methods:

- Pre-programme teachers' survey (May 2016): These were aimed at the lead teacher from each Polli:Nation participating school to gather base-line data against which results could be compared at the end-of-project survey. The survey included questions around young people's engagement with environmental issues, whole-school commitment to environmentally-friendly practices, and teachers' confidence in teaching outdoors and about the science of pollination. Sixty lead teachers completed the survey.
- Participant-observation (August 2016 – May 2017): Researcher, Andy Ruck, made twenty-six visits to eleven different schools, and engaged in participant-observation during Polli:Nation activities – that is, taking part in tasks alongside the pupils and talking to them about their experience of the project, then typing up detailed 'fieldnotes' after each visit….a range of criteria to ensure diversity, such as the inclusion of both primary and secondary schools, and schools in both urban and rural locations.

Focus groups (March – June 2017) Towards the end of Phase One of the project, twenty focus groups were conducted with small groups of between six and eight pupils [schools were selected by facilitators in each of the four nations] who were asked to identify schools that had been particularly active within the project, in order to ensure pupils would have sufficient experiences to draw upon. The main activity in each focus group involved pupils selecting, from a series of flashcards based on fieldnotes gathered during participant-observation, the features of the project that they considered to be most important (for example, practical conservation tasks, science-based activities, and working with experts from outside of school). They were also asked questions about what they had learned throughout the project, and whether there had been any changes in their attitude towards conservation and environmental issues.

University of Stirling Evaluation

Methodology (cont.)

Teacher interviews (April – June 2017, May – June 2018)

Interviews with lead teachers were also conducted in all the schools in which focus groups were carried out. These focused especially on challenges they had experienced in facilitating the project, and any suggestions they may have for how a future project of this nature might be improved…five of these teachers were contacted again for telephone interviews…{and with} five teachers in Phase Two schools.

Interviews with Polli:Nation Project Officers and facilitators (March – June 2017, June – July 2018)

The staff delivering the majority of Polli:Nation sessions consisted of four 'Project officers' employed by LtL, who between them covered a large proportion of the schools across the country, and a number of 'facilitators' covering the rest. Interviews were conducted with two Project Officers and two facilitators. These interviews were useful in confirming the trends observed in the schools already visited, as well as for feedback on implementation of the project as a whole.

Follow-up Teachers' Survey (June 2018)

This survey – again distributed to lead teachers in each Polli:Nation school – asked similar questions to our pre-programme teachers survey, in order to compare results and assess the extent to which the aims of the Polli:Nation project had been achieved across all Phase One and Phase Two schools. Whilst this survey was targeted at teachers, its focus remained on young people's learning through the project, and how this was supported, understood, valued and experienced from teachers' perspectives. Unfortunately, despite repeated email reminders, we received only twenty responses to the survey. These responses were nonetheless useful in confirming or supporting trends that had emerged from all the above interviews, focus groups and observations. Survey results are therefore used in this report to add further support to claims that have been evidence elsewhere, rather than as evidence in their own right.

University of Stirling Evaluation

Key Outputs

- 35,721pupils were involved in the project and it is estimated that 7,800 of these pupils were more intensively or regularly involved.
- 2,185 adults were involved in the project
- Volunteer hours worth at least £309,075 (around 22,610 hours) were recorded

Outcomes for people

Overall, participants' experience of the project has been overwhelmingly positive, even across the wide variety of contexts. Pupils who were actively involved in the project have displayed a strong understanding of the importance of pollinators for food growth and biodiversity, and are often motivated to continue their conservation efforts outside of school….Pupils have shown….increased confidence after talking about the project in Assembly, improved literacy through contributing to their school's Polli:nation blog, and an interest in careers such as landscape gardening.

Particularly heartening are the numerous cases of pupils who, according to their teachers, were mostly disengaged with learning before taking part in Polli:Nation, but have suddenly shown great enthusiasm for this project specifically.

<u>People have learnt about heritage</u>

…knowledge about pollinators is by far the clearest and most obvious impact of the project, according to both focus groups and survey responses. …the project tended to involve small groups of pupils, rather than being a 'whole-school' project, but among these small groups, high levels of knowledge about pollinators was clear to see. To a lesser extent, pupils also learned about other aspects of their natural heritage, usually through the off-script and impromptu learning moments that the project afforded.

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A key question used in all focus groups was around learning, usually phrased as 'what sort of things do you feel you know more about after taking part in Polli:nation?'

Some quotes from pupils and teachers shared on this page show examples of the learning that took place.

Top image Malcolm Cochrane

'The Polli:Nation project is about helping bees, and finding out what we can do to help. Like, even more than we are now. Like, 'cos we're building habitats for them, and if we don't do anything about it, they'll be extinct in twelve years…And if we didn't have bees, like, most of our food we wouldn't' have, like bread or stuff like that, because of the pollination…'

Year 6 pupil, Wales

'I didn't know there was, like, different pollinators. I didn't know that butterflies and moths and flies were pollinators. I know the different bees, like honey bee, the bumble bee, but I didn't know moths and they were pollinators'

Year 6 pupil, Scotland

'Understanding what pollination is, why it is so important, why pollinators are endangered and how the children can make a difference by creating a habitat for pollinators in our school playgrounds.'

Teacher

Bottom image – learning about the pollination process

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People will have developed skills

Across all focus groups, pupils on the whole displayed an ability to describe appropriate conservation actions, at least to a basic level – for example, they understood that by making certain changes to their school grounds (such as planting flowers and/or leaving areas unmown), they could create habitats that were more suitable to pollinators. It was difficult to determine the extend to which learning had gone beyond this – for example, whether pupils would be able to remember the *types* of flowers that were most pollinator-friendly, or what the appropriate conservation actions would be if starting a similar project on a new site. It should again be noted, however, that Polli:Nation has at least acted as an important starting point on which young participants can build significant further knowledge and skills.

…our pre-programme teachers' survey showed that the majority of respondents *already* considered themselves confident in using the outdoors in their teaching, and teaching about environmental issues. Nevertheless, the twenty respondents to the follow-up survey largely (seventy percent) agreed that Polli:Nation had made a difference to their confidence teaching in these areas. Of the other thirty percent, twenty-five percent neither agreed or disagreed, and only five percent (one respondent) disagreed.

Commonly, … pupils [who took part in small group work on Polli:Nation] were identified as having additional support needs (ASN), or at least as being disengaged with 'normal' classroom-based learning. [Teachers in one school] were particularly keen to point out not only the pollinator-specific knowledge the pupils had gained, but also the confidence they had gained from speaking in front of the whole school in Assembly about the project, and the recognition that came from being the school's 'experts' on a project that was 'theirs'.

…one Scottish secondary school…lead teacher saw Polli:nation primarily as a vehicle for improving literacy among his ASN pupils, as well as their 'employability' skills [such as] working together as a team to transform a garden, and learning practical skills…

[At Machanill Primary School] staff cited one pupil in particular as benefiting hugely from the project. She had been probably the most keen and engaged within the group, and the most articulate in the focus groups, but according to the teachers, normally had a very low school attendance record, and struggled with most subjects. Polli:Nation had finally provided something that interested and inspired her, and she even expressed interest in working as a gardener in [the] future.

University of Stirling Evaluation

<u>People will have changed their behaviour</u>

Insights are limited to participants' self-reported intentions to alter their behaviour as a result of the Polli:nation project. There are, however, encouraging signs, with pupils often expressing a desire to engage in activities similar to those experienced through Polli:Nation, when asked whether there was anything they would do differently in the future.

In focus groups there were many indications from pupils that – in essence – they used to be scared of bees and instinctively wanted to squash them, whereas now they appreciate how important they are, and think of them differently.

On this page are quotes from pupils expressing these feelings.

I'm getting my own bit of garden at home to plant stuff in, so I'm going to do that.

Year 5 pupil , Scotland

The bees are attracted to me, and I think they're cute…[Before Polli:Nation] I thought like they were going to sting you all the time so I carried on running away from them, and then when I picked up my first bee I was really happy, and I picked up some more. They just crawled on my arm…[There's something powerful about] the way they look at me.

Year 8 pupil, England

I'll be kinder to bees, because once you realise like how important bees and stuff are, you actually start to take more care of them.

Year 4 pupils, Scotland

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University of Stirling Evaluation

Summary of findings

Impacts on young people

1. Young people have substantially increased their knowledge about pollinators and their ecological importance.

2. Young people have engaged in and understood their conservation actions in response to the decline in pollinator numbers.

3. Pupils have become motivated to continue to participate in conservation actions and changed their attitudes towards pollinating insects.

4. Other impacts on some pupils included increased confidence, improved literacy through contributing to the Polli:Nation blog, and an interest in related careers.

Impacts on teachers and schools

1. Teachers reported positive changes to their attitude towards the environment.

2. Teachers reported improvements in their confidence in leading activities in outdoor spaces, regardless of their previous levels of expertise in this area.

I found it enjoyable, how you get to learn a lot about pollination, and how everything is produced an' that…I didn't think bees were important, but I've found out that they do a lot of things for us, if we didn't have bees we wouldn't have a lot of fruit and vegetables we could eat…'

Year 9 pupil, Scotland

The pupils have benefited greatly from the Polli:Nation project as they are aware for the decreasing number of bees and how important it is to encourage bees into their own garden and he school grounds.

A pollination teacher

I think it has been most useful for the children to learn what is happening in our environment and understand that they are able to make a difference for the better by making small, simple changes.

A pollination teacher

Image left by Malcolm Cochrane

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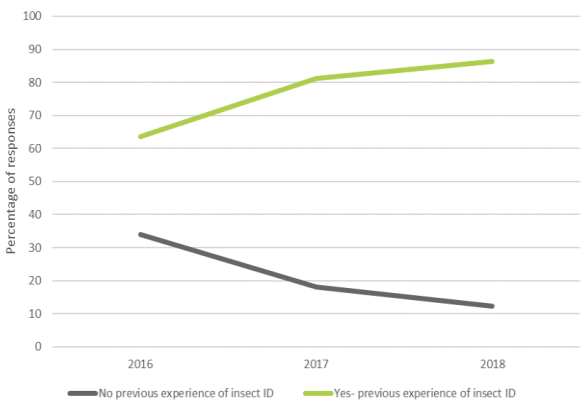
Survey Analysis

Highlights (Extracts taken directly Polli:Nation, 2016-2018 Survey Results by Katy Cruickshanks (Butterfly Conservation) et al.)

- 1161 sets of survey results were received from 336 groups over the three years of the Polli:Nation project
- 58% of results were from Primary Schools; 16% from Secondary Schools & 28% from public groups (62% of all groups were Polli:Nation registered)
- The highest number of submissions was 42 from Bryncethin Primary School in Bridgend, Wales
- Being registered and having support from facilitators supports the submission of data
- The busiest survey year was 2016 with 47% of all surveys submitted in 2016, 24% in 2017 and 29% in 2018
- Due to involvement in Polli:Nation, the proportion of groups with previous experience of identifying insects has risen by 22% over the three years of the project.
- According to the data, 148 groups submitted responses after making positive improvements for pollinators

The number of groups taking part each year has decreased since the launch year in 2016 but there was a marked upturn for the number of Polli:Nation schools submitting data in the final year (2018). This could suggest that enrolment on a project and a higher level of support from facilitators can positively impact the amount of data collected.

As part of the survey, we asked participants to state whether they had previous experience of identifying insects. Now that Polli:Nation has come to the end, it is interesting to see the increase in the number of survey submissions with a positive response to this question over time and also the decline in the proportion of groups without experience of insect ID (Figure below). These divergent trends are to be expected as merely taking part in Polli:Nation gives participants the experience of identifying insects and therefore the proportion with ID experience has risen by 22% over the three years of the project.



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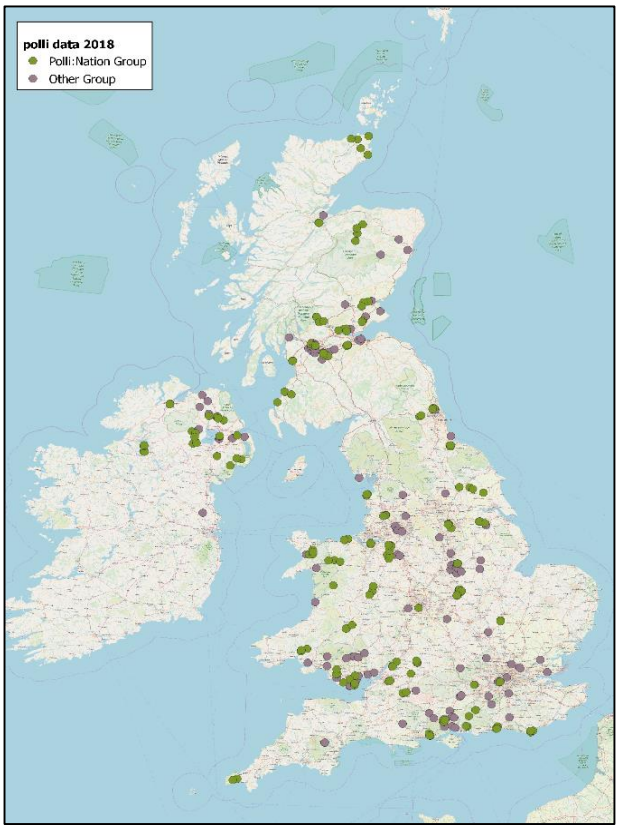
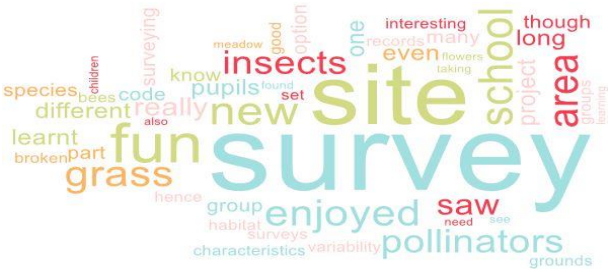
Survey Analysis

Where did the surveys take place?

The highest proportion of groups were located in England (48%) followed by 25% in Scotland and 16% in Wales and Northern Ireland (11%).



A comments field was provided as part of the online data entry system. A word cloud has been created using entries into the comments field.



Highlights of habitat surveys

- Over 14,500m^2 of wildflowers were recorded as part of the Polli:Nation survey
- The area of wildflower habitat surveyed has increased over the life of the survey
- The area of short grass surveyed has declined over the 3 years of the survey
- According to the survey submission data, 148 groups recorded that they had made at least one change to their site
- The most popular habitat to create year on year has been to add pots, build raised beds or plant flower beds with 125 groups (84%) carrying out this work. Creating wildflower meadows/verges was the second most popular (66% carried out this improvement).
- There was a significant increase in the area of feeding habitat (and a significant decrease in the average area of man-made features (bare walls/fences, concrete/tarmac, short grass) following improvements
- There was an increase in observations of woody and wild plants in flower following the improvements for pollinators

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Survey Analysis

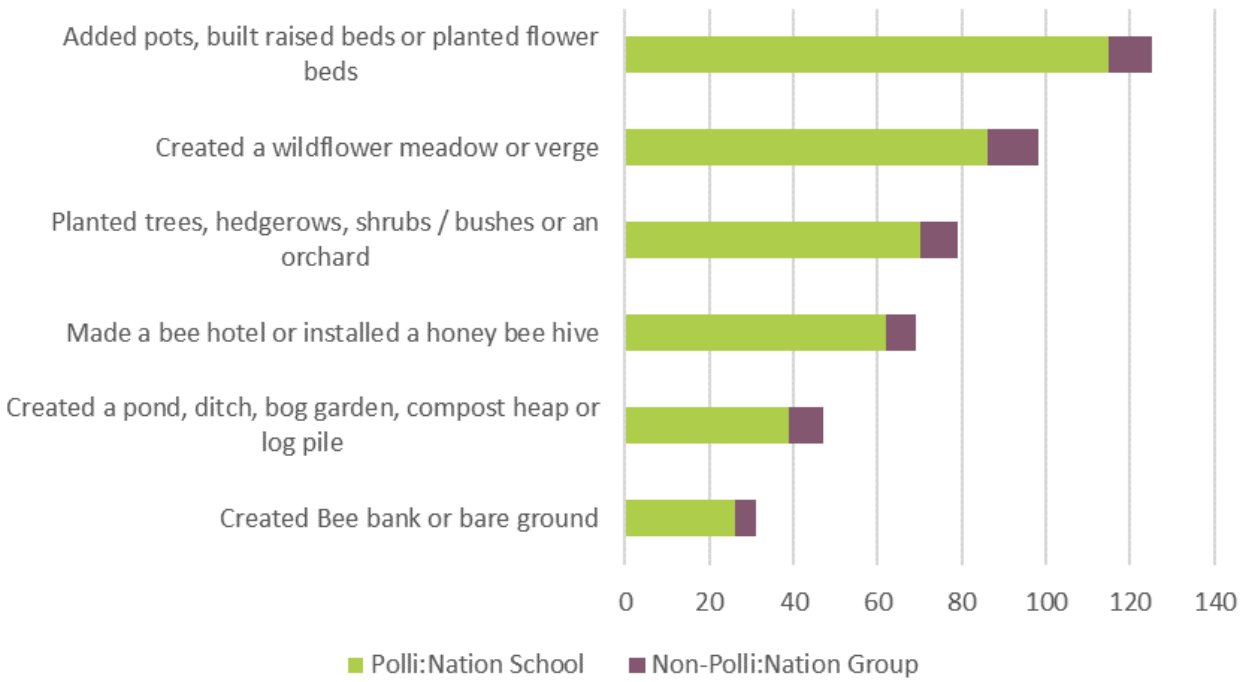
What habitat improvements were made?

According to the survey submission data, 148 groups recorded that they had made at least one change to their site. Most of the groups that made changes were registered Polli:Nation groups (90%) and the remaining 15 groups were making changes on their own.

There was an option in the survey to submit a code to indicate surveys that are paired before and after surveys at exactly the same location with respect to a change. When extracting paired comparisons (as indicated by a code), 86 groups (out of 148) submitted 144 paired surveys (288 in total) from to analyse regarding actual change in habitat, flowers and pollinators.

From these 144 paired surveys there is a significant increase in the area of feeding habitat and a significant decrease in the average area of man-made features (bare walls/fences, concrete/tarmac, short grass) following improvements.

There was no significant change in the area of nesting habitat recorded in the 144 surveys before and after improvements for pollinators. The occurrence of different species of plants in flower differed between the surveys before changes were made, compared to the surveys carried out after the changes were made. The most noticeable difference was the increase in observations of woody and wild plants in flower following the improvements for pollinators.



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Survey Analysis

Pollinator results – Highlights

- Over three years 18,866 pollinators were recorded and there were 2867 two minute quadrat searches which represented 66 hours of survey time or 20 days of school!
- Most surveys were conducted in June and July
- Overall there were significantly more pollinators found after habitat improvements were made (an average of 7.7 insects per 1m quadrat compared with 4.3 before)
- Statistical analysis indicates there was a significant increased pollinator abundance with the area of pollinator feeding habitat and number of plant species in flower. In addition, more pollinators were found where the quadrat contained more flowers, damp places and wildflowers. In particular hawthorn, thistle, and nettle improved the likelihood of finding insects
- There was decreased pollinator abundance in quadrats with short grass, concrete or tarmac and interestingly lower numbers found near clover, daisy, dead nettle and blackthorn
- In terms of the range of groups found, creating damp places and wildflower areas has a positive effect on total pollinator diversity
- Wildflowers had a positive effect on the number of quest species found whereas short grass had the opposite affect
- 62% of groups recorded at least one species of pollinator
- The greater the area of wildflower the more species recorded
- The Honeybee was the most commonly found quest species for three years running

Considering all the data provided from 1,161 surveys over 3 years we now have data from 2,867 quadrat searches each lasting 2 minutes which equates to over 66 hours of survey time which is nearly 20 days of school! Across all 2867 quadrat surveys, 18,866 pollinators were recorded. The average number of pollinators encountered before improvements were made was 4.3 and this increased to 7.7 in the surveys carried out after improvements were made for pollinators.

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Survey Analysis

What affects the total abundance of pollinators seen in the survey?

The area of feeding habitat recorded positively influenced pollinator abundance. Higher pollinator abundance was recorded in habitats containing damp places and wildflowers and to a lesser extent trees and flower beds and flower pots. Short grass areas and concrete/tarmac had a negative effect on pollinator abundance.

The Number of plant species in flower positively influenced pollinator abundance.

The year of the survey - 2017 and 2018 resulted in more pollinator abundance compared to 2016

Floweriness of the survey quadrats - Pollinator abundance was greater in quadrats that were more flowery.

Type of flowers encountered in the survey - More pollinators were recorded in quadrats containing hawthorn, thistle, nettle, vetches and bramble whilst fewer pollinators were recorded in quadrats containing clover, Dead Nettle, Daisy and Dandelion.

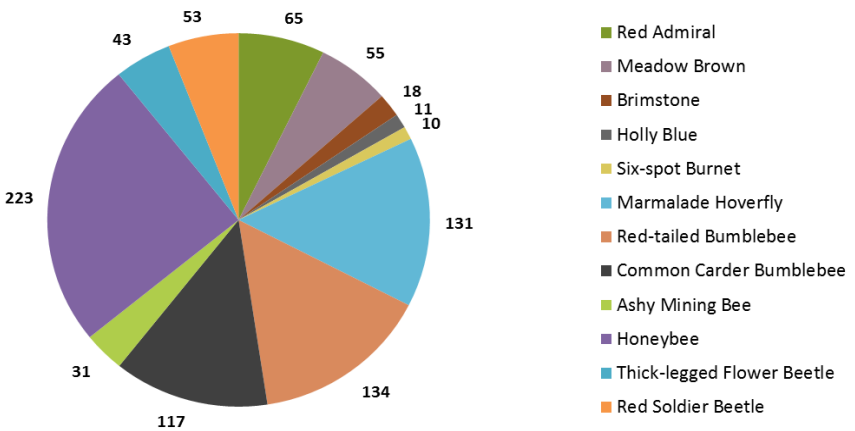
Which of the six improvements for pollinators resulted in the greatest increases in pollinator abundance and diversity?

Creating damp places and planting wildflowers have the greatest positive impact on total pollinator diversity whilst the effect for planting trees was negative. However, the positive impact of tree planting clearly takes a number of years to become evident as the trees take time to mature and start to blossom.

Species Quest Pollinators

In addition to pollinator group counts, participants were encouraged to record the presence of any species from a list of 12 key, easily identifiable pollinators. From the 1161 surveys, 39% (448 surveys) generated records of at least one species.

The peak time for submission of species quest records was May to July, with the highest number of recorded sightings in July. The number of records of each of the species quest species across the 1161 surveys over three years is shown below.



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Feedback from schools and facilitators

Throughout the project facilitators fed back quarterly reports from the schools they were working with. In these reports they highlighted what was going well but also feedback about some of the difficulties they were facing.

Some of these difficulties we could respond to eg where schools, or a whole cluster, dropped out we could seek to replace them. Others we could do little to change – but adapted where we could, such as a school being burnt down and another changing sites. In these cases we ran smaller projects and undertook two initial surveys instead of follow-up surveys.

Some common themes also appeared throughout the project and examples of have been clustered together under these headings.

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Feedback from schools and facilitators

Some highlights from schools

Impact on pupils

This can best be shown by quotes from pupils and teachers involved in the project. Feedback suggests that pupils have enjoyed taking part in the project. For many knowledge has increased, engagement with school improved and respect for the environment raised.

We have lots more wildlife. The butterflies are gorgeous. Our school grounds are getting better every year. We love the meadow.
Year 6 pupil

"The Pollination Project has been extremely beneficial to our school – for the pollinators that will continue to visit for years to come, and also for the children who are now more focussed and knowledgeable about their environment. The impact on their learning and attitudes towards nature has been profound resulting in a strong sense of ownership and pride. This was exhibited recently on discovering the grounds contractors had accidently mowed a section of the wild flower area.. 'that's disrespectful to our environment!' was the response from a Year 3 child".
Teacher, Chesterton

I loved it, we were learning something totally different from the work we do in class. It was difficult because it was windy but it was a challenge that I really enjoyed. I had great fun.
Pupil from Case of Gowrie cluster

The children are beginning to write their learner's statements for their report cards and the daffodil dissection and pollination project is frequently being written about which is great!!'
Teacher, North Coast Caithness cluster

Our SEN pupils benefitted hugely from this project – giving them practical activities that stimulated those who needed a hands on approach to learning. When surveying it was incredible to see their attention held for so long when looking at hoverflies, bumblebees and butterflies they had caught.
Year 5 teacher, St Stephens Junior School, Bristol

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Feedback from schools and facilitators

Some highlights from schools

Impact on teachers

- Several teachers reported an increase in knowledge. This was particularly in relation to their understanding of pollinating insects other than bees and the types of habitats and food sources that would attract them.

Involving parents

- One school established a parent engagement committee who fundraise, design and plan changes to the school grounds including pollinator-friendly planting.
- Parents with ecological knowledge have been particularly supportive of the project. At one school one parent brought in a moth trap.

Involving the community

- Engaging with local community groups and sharing knowledge about planting for pollinating insects outside the school gates.
- Several schools made links with local bee keepers.

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Feedback from schools and facilitators

More highlights from schools

Events – in and outside of school

- Many schools held their own Polli:Nation events or held Polli:nation activities within other school events, such as school fairs, community days and specific Polli:Nation days.
- Several schools spoke at local conferences including: CREST awards and NE Bee Keepers Convention
- Schools attended DEFRA Bees Needs Awards presentations and received awards for work on their Polli:Nation projects
- The project was also recognised for our work and became a DEFRA Bees Needs Champion in 2018.

Areas of the curriculum

- Whilst science was the subject most schools linked to they also used the project within art and design, design and technology and English and Maths (or equivalent subjects in the different nations.)

Other highlights

We have presented the project at the Our South Downs Conference, the International School Grounds Alliance conference in Sweden, EcoSchools Worthing EYE project, the Gardening for Wildlife Forum and SEEd national conference as well as at the Bees Needs Pop Up store in Carnaby Street, London in 2018 run by DEFRA.

Bringing in additional resources

Many schools brought additional resources to the project through Tesco 'Bags of Help' and other local supermarket funding, Greggs' Foundation, local councils, Project Dirt, gifts in kind from families and local companies.

Press and other publicity

The project made the national press including the Sunday Telegraph and the Sun newspapers as well as dozes of articles in local press and on local radio stations.

St Albans Primary, Havant school receiving their DEFRA Bees Needs award from Lord Gardiner of Kimble

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Feedback from schools and facilitators

Thumbnail case studies

Scotland

Inverness High school have radically developed their school farm and created a 750m² cornflower meadow, a clover bed, several wildflower beds, a wallflower bed, a traditional orchard and a winter heather bed to provide nectar in January and February. The Edge group working on this have won a Young Enterprise Award for sustainability for the design and production of recycled feeds and a Social Enterprise Academy Award for sustainability for selling jam using plumbs from the garden. Money made from sales goes back into the garden.

Glenrothes High School Department of Additional Support have taken the lead in creating a fantastic pollinator friendly garden space which they now use on a regular basis.

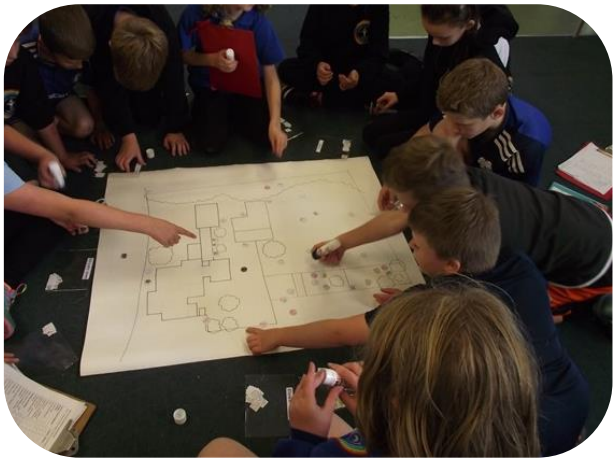
Bellsquarry Primary School's practical development day involved the whole school and parent volunteers. They later held a Polli:Nation tea party to celebrate the project and all involved.

Thumbnail case studies

Wales

Builth Wells County Primary School have developed their own Polli:Nation Project Maths Challenge cards for teachers when they are taking their classes outside. They were also translated into Welsh to give them added value.

At Ysgol Riwlas one student with severe emotional and behavioural difficulties has particularly benefited on being part of Polli:Nation and there are boys who would not have come into school who are coming in early to water the garden.



Feedback from schools and facilitators

Thumbnail case studies

Northern Ireland

More than one school in the province have discovered bee banks on their school grounds and are now working to protect them.

Cambridge House Grammar School In County Antrim discovered the rare Irish Lady's Tresses orchid in their grounds as they let a meadow grow in their grounds as part of their project.

Thumbnail case studies

England

St Albans Primary School have developed a 'Pollinator Promise' which encourages people throughout the UK to pledge to make a 1m² patch of ground pollinator-friendly. They have received a number of awards for this work.

Larkhall Academy reported that the majority of pupils working on the Polli:Nation project managed to produce the 400 words required for their English Literacy National 4 exam when they would otherwise not have achieved any qualification in English. They were able to effectively express how the change to the grounds had influenced them personally.

Schools in Tryhall and Mousehole in Cornwall have been helping to save the long-horned bee which is a species becoming more and more rare. They are not only making changes to their grounds but persuading members of the local community to do the same.

Feedback from schools and facilitators

Issues and difficulties

Time & fitting in with existing work load

Several teachers spoke of pressures from existing workloads. This caused a number of schools to drop out of the project, although several of these were replaced by other schools. The teacher who found the project easiest to fit into their work were those either working part-time or those with a particular responsibility for outdoor learning. Sometimes this was the same person.

Whilst some schools managed to fit the project into their curriculum work many more ended up running Polli:Nation with smaller groups such as Eco and gardening clubs.

Difficulties in linking to the curriculum

Despite providing schools with curriculum-linked resources for all nations several schools struggled to make the project fit in with lessons.

Secondary schools found this particularly difficult, with some schools struggling to get the work finished because of the extra time needed by staff.

Being a phase two school

After the initial survey the project was divided into two phases with half the schools in each cluster planning and developing their grounds over two separate years. Several of the schools taking part in phase two struggled to re-engage with the project. This was be due to staff changes, or changes in school policy and priorities. Where possible we tried to keep schools on board or replace them but did lose a couple of phase two schools from the project.

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Feedback from schools and facilitators

Issues and difficulties

Changes in staff or staff roles

There were several staff changes at schools throughout the project. Some were senior managers who were not there when the school signed up to the project. Whilst some were very supportive others had different priorities and did not give the staff working on the project their full support.

In other schools lead staff left the school and new staff taking over did not have the same enthusiasm for the project. Facilitators often gave these staff additional support and some projects continued successfully, whilst it was more of a struggle for others.

Changes in circumstances of schools

A small number of schools moved sites during the project. One school had hoped to focus on their new site but liaising with the contractors and architect took time. Some of their ideas have taken place whilst others have yet to be achieved.

One school was burnt down during the project – whilst another moved site.

Schools reporting

Many schools found the reporting of the project quite a burden. Facilitator time to support them with this aspect was limited so it is likely there will be some underreporting from some schools. Whilst some continued to blog this was one task too many for some.

Lessons learned from the Polli:Nation team

Some of the positives

- Project Officer/facilitator system works well
- Good partners who are enthusiastic about the project
- Active steering group who all have a role in delivery
- OPAL survey packs and OPAL staff
- 1/4ly reporting
- HLF relationship and flexibility

Some of the negatives

- Too many bits of things schools have to do. Keep it focussed, simple and high quality.
- Website complicated with too many resources. A few superb resources which are easy to find
- Contact was sometimes hard to pick up with phase 2 schools – we need not to have two phases – everyone needs to be doing something throughout the length of the project
- School SMT must be involved in first site visit to overcome issues with staff changes

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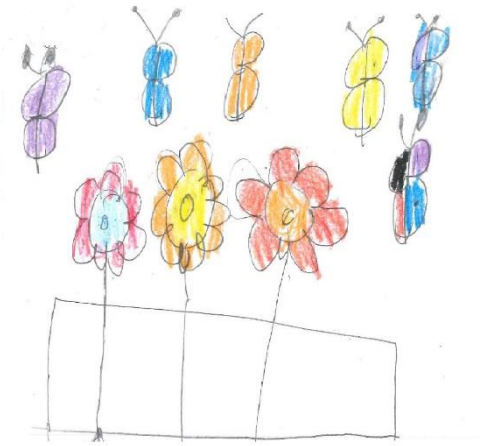
Lessons learned from the Polli:Nation team

Some ideas of things to adapt for other projects

- Inspire teachers on the very first visit by delivering a brilliant all singing and dancing introductory session to the kids and teachers…Then they can be supported to deliver themselves once they've seen how it's done. Positive role modelling of outdoor learning from the very first meeting.
- Art competition has been a really positive way of getting people involved and looking at how we can spread the message
- Much of the work has taken place in small groups eg eco-clubs or gardening clubs – rather than whole classes



Some things we would change

- Increase identification skills and habitat change skills of facilitators
- Look at best time for schools to claim – avoiding end of the financial year if possible and noting schools like to do most in the summer term – avoiding SATs and sports days!
- Schools cannot all afford to claim up front – especially smaller early years settings.
- Less of the other stuff, blogging, hives, competitions etc. Would have loved to have spent a lot of time embedding survey – which is really important rather than training in/pushing blogging
- Training in budget for staff across the length of the project – so that we can introduce more elements/maintenance/more detail etc as the project progresses – not all learning is at the beginning of the project
- Create an advice sheet on taking photos – and to ask for jpegs not images within documents – and set a protocol for labelling images

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Summary of what went well

The overall aims of the project were clearly met;

- Children and young people have been engaged and enthused to protect pollinating insects
- There has been an increase in the abundance and diversity of pollinating insects in school grounds and local community spaces

The structure of the project proved very successful – from steering group to facilitators and the provision of grants. This meant that our team based across the country, supplemented by our network, ensured that schools felt supported and inspired.

The project engaged children from 3-18, school staff, parents and hundreds of volunteers in all four nations of the UK.

Schools achieved amazing things in their grounds – from setting up new campaigns, helping to save rare bees, to creating whole meadows of wildflowers and orchards. Pupils showed that they could make a real difference to their environment and the wildlife that lives there. If these children and young people are anything to go by our environment is in safe hands!

And finally - we won the environment section of the 2018 National Lottery Awards!

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Summary of what could have been better

Uploading survey results

The analysis of survey data submitted found that 70%, or 202 of the groups involved were planning on making changes to their grounds. Of this 132 were Polli:Nation schools. However, we know that this an under-representation of the work actually carried out on the ground. We have evidence that at least 254 schools have actually made changes to their grounds, supported by their applications and invoices for the work completed and confirmed by feedback from their facilitators on the ground.

We believe that this is because schools often found it hard to find the time to upload their on-line data. The project did not allow for time at the end of the project to enable facilitators to aid schools with this part of the project and any new projects need to ensure that this time is allowed for this to happen.

The cluster structure

Whilst in some areas the idea of a cluster of schools with a lead worked well for many more this proved less successful. Where it worked a strong teacher led the way and brought their knowledge and enthusiasm to the wider group of schools. Where a teacher like this was not present schools tended to work on their own.

The complexity of the website

There were many resources uploaded into the website with a search function for schools to find which were the most useful for them. Because of the number and range of resources schools found this area of the website too complex. In response to this we have simplified the legacy website and suggested to schools a smaller range of resources to be used at each stage of the process of their projects.

A year without activity

All schools started together but, once they had completed their first survey, half the schools had to wait a year to continue with their projects. This did not work well and re-engaging schools for the second year often proved difficult.

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The legacy of the project

What we have left behind

What schools have said they will do

Schools told us that they would use the following activities and information from the project in the future:

- The OPAL survey
- Curriculum resources linked to pollination
- Resources linking pollination to food supplies
- The eight pollinator group images
- Plant flash cards
- Mapping sheets and activities

Polli:Nation Pow Wow webinar

On 7th February 2019 we held a Polli:Nation webinar where we celebrated the successes of the project.

We gave an overview of the project, shared images and thoughts of the pupils who took part and fed back on research related to the project – including the main findings from the survey analysis and the evaluation of the project.

We had over 60 people tune in on the day from as far away as Chile, the US, Bratislava and Malta! The webinar is now available for anyone to watch at any time on the Polli:Nation website.

Polli:Nation Maintenance Guide

This guide has been designed to be an easy to follow resource to be used by schools and their grounds staff together, so that they can ensure school grounds are not just changed for the benefit of pollinating insects but also stay that way into the future.

This part of the project was paid for by the National Lottery Award prize and each project school will receive two hard copies of the guide. Additional copies will be given to schools LtL works with across the UK. It will also be available on the project website.

Polli:Nation website

The website has been simplified to make it more user-friendly for schools without a facilitator to help them out. Polli:Nation resources will be available for at least five years and will also feature on LtL's own website along with other Polli:Nation projects.

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The legacy of the project

What we have left behind

Information for similar projects

Andy Ruck from the University of Stirling came up with these recommendations for similar projects:

1. Continue to encourage small-group working.
2. Maximise the hands-on and practical aspects.
3. Maximise contact time with visiting 'experts'.
4. Build in funding to cover teachers' class time.
5. Engage more regularly with schools in a more in-depth and sustained way.
6. Involve all schools in the same 'phase' of the project, rather than having two phases.
7. Strike a balance between providing concise resources and encouraging creative responses.
8. Clearly link the project to curricular outcomes in each nation of the UK.
9. Encourage inter-school co-operation but do not make 'cluster working' a requirement.
10. Strike a balance between the educational quality of citizen science-based tasks, and the quality of scientific data collected.

Follow-on projects

OPAL and LTL have been working with a series of university partners to develop some new projects based on Polli:Nation.

- Polli:Bright. The Polli:Nation resources have been translated into Italian and are being used by schools in Tuscany, supported by local universities and museum services.
- X-Polli:Nation. A project funded by National Geographic building on Polli:Nation and looking at how different technology can help schools with pollinating insect identification.
- Additional applications have been submitted for the development and delivery of projects based on using Artificial Intelligence to help schools, and other groups, identify pollinating insects and the plants they feed on, and we have heard that at least one of these will take place over the next three years
- A European funding application has also been submitted based around Polli:Nation and expanding the project around food webs and to include birds.

Organisational resilience

Polli:Nation has developed the skills and experience of our project development and delivery teams, specifically related to species conservation projects in schools. It has also enabled us to build our experience of working on large-scale, partnership projects which has led to new partnerships for future projects.

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Acknowledgements

First of all we would like to thank Chloe Atkins who, with Juno Hollyhock and the wider Learning through Landscapes team, put the initial idea of Polli:Nation together. They created a project that has proved beneficial for both pupils and pollinators. Also to David Hodd who was the first Polli:Nation Project Manager and who set up many of the systems needed to run the project. We'd also like to thank the National Lottery Heritage Fund who made this project possible in the first place.

Many thanks go to our partner organisations: OPAL at Imperial College London, the University of Stirling, TCV, The Bumblebee Conservation Trust, Butterfly Conservation, Buglife and the Field Studies Council. Thanks for their expertise and support throughout the project.

Thank you to the LtL Project Officers and our accredited network of facilitators who worked with the schools to help them make the project work.

But mostly our thanks has to go to the schools – the teachers, support staff, grounds staff, parents, volunteers and the pupils. Many, many hours of time and energy has gone into helping our hungry and homeless pollinating insects and, on behalf of them all a big THANK YOU to you all!

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