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Barriers to engaging in Citizen Science: Feedback report to ZSL

Let's Go Outside and Learn CIC
REGISTRATION NUMBER 9435120

Contents

1 BACKGROUND

This project is part of several ZSL initiatives aimed at boosting the number and diversity of people that work with us to restore nature. In 2024 the ZSL Estuaries & Wetlands Conservation team worked with Let's Go Outside and Learn CIC on a project funded through the Esmée Fairbairn Foundation to better understand the barriers to engaging a more diverse pool of volunteer citizen scientists to their projects. The project aimed to identify methods or approaches to widening participation in environmental citizen science projects delivered by ZSL.

THE PROBLEM

There are concerns about whether the benefits to participation in citizen science are evenly distributed within the community with consequences for organisations including ZSL that rely on Citizen Science for monitoring and data collection. Lack of diversity reduces rates of participation and therefore limits ZSL's capacity to deliver monitoring. Lack of diversity also leads to some areas geographic areas receiving less monitoring attention than others related to local demographics rather than environmental need.

Recent research has concluded that it is unclear how diverse participants in citizen science were. This research[i] has shown that men were more likely to participate than women and people identifying as from white ethnic groups were more likely to participate than those identifying as from minority ethnic groups; participation by women from minority ethnic groups was particularly low. Participation by those from white ethnic groups declined with socio-economic status, but this was not the case for those from minority ethnic groups. Participation is highest amongst those in education (studying at school, college, or university) and lowest amongst the unemployed.
This research reflects the participation of citizen scientists the Crane catchment e.g. Citizen Crane

2 WORKSHOP PROGRAMME

The project was focused on Hounslow, West London and specifically in Cranford. Eleven neighbourhoods in Hounslow are ranked among the most deprived 20% in England. Deprivation is generally higher in the west of Hounslow (further from Central London) and includes areas of Cranford.[ii]

The borough profile of Hounslow makes it an ideal area to explore barriers to engagement with citizen science. Hounslow,[iii] an outer London Borough with significant areas of green space, has a diverse demographic make-up:

- **Ethnicity:** 52% of residents are Black, Asian or Minority Ethnic, compared to the London average of 43%.
- **Languages:** Hounslow has a higher number of South Asian, West African and European languages spoken than the London and England average. The top five languages spoken (other than English) are Punjabi, Polish, Romanian, Urdu and Nepalese.
- **Poverty:** 33% children under the age of 16 live in low-income families and 18% live in families with relative low income. 11% of households are in fuel poverty.
- **Employment:** 74.5% of residents between 16 and 64 are in work, lower than the London (75.8%) and England (75.7%) averages. 6.5% 16- to 24-year-olds are self-employed, lower than the London (10.4%) and England (8.2%) averages.
- **Digital exclusion:** Hounslow has a high proportion of wards which are amongst the most digitally excluded in England. The west of the borough generally has a higher risk of digital exclusion than the east of the borough and the Cranford Ward has the lowest proportion of residential premises with internet access when compared with the rest of Hounslow.

The engagement was devised as three linked workshops held by Let's Go Outside and Learn CIC in partnership with ZSL. The first workshop was a taught session which gave background information about the concept and practice of citizen science and what is involved in engaging in a citizen science project. The session included examples of national and local citizen science projects. The second workshop was participant-led and included time to discuss practical considerations such as equipment and safety, recording data and sharing data. There was also time to

discuss barriers to participants' engagement with citizen science. The third workshop was a practical workshop which gave participants the opportunity to learn some of the techniques used in data collection.

The workshops were designed to be accessible, welcoming and led by experts. The project teams were mindful of the needs and interests of the participants and worked to reflect these interests in the delivery. For example, transport was identified as a barrier so was paid for and arranged by the team to enable a disabled participant to attend.

WORKSHOP PROGRAMME

Programme for Workshop 1	
Activity	Led by:
Introductions	All
Definition of citizen science and why it matters	LGOAL
Examples of citizen science – national projects	LGOAL
Local opportunities	ZSL
Next steps	LGOAL
Visiting a local open space (optional)	

Programme for Workshop 2	
Activity	Led by:
Introductions	
Review of first workshop	All
Feedback and discussion about barriers to accessing citizen science	All/workbook
Planning our activity: dates and surveys	All
Planning: Part 1 Aims, data collection and recording Working safely, equipment, clothing	In groups using workbook
Planning: Part 2 Sharing data, permissions Impacts of survey and mitigations	In groups using workbook
Next steps Local opportunities with ZSL and others	LGOAL/ZSL
Visiting a local open space (optional)	LGOAL/ZSL

Programme for Workshop 3 - BioBlitz	
Activity	Led by:
River invertebrate sampling	ZSL
River habitat transect survey	LGOAL/ZSL
Next steps Local opportunities	LGOAL/ZSL

Photo record of workshops

Workshop 2: working in teams

3 TARGET AUDIENCE AND PROMOTIONAL MATERIAL

The project aimed to recruit participants who had no previous experience of citizen science and who came from those groups identified as not likely to participate – women, unemployed people, those from ethnic minorities, people who were differently able or disabled, people from lower social/economic backgrounds and those living in an urban setting.

To appeal to the target audience, promotional material was developed for the project that was designed by a graphic designer. The material aimed to be reader-friendly, accessible, to spark interest, contain practical information, and motivate readers to join the project. The initial reference point for the graphic design was a series of stamps published by Australia Post[iv] which show images of citizen science including equipment, collaboration and data collection.

The promotional material used the following best practice[v] in developing a communication tool:

1. To make the project goals clear, the message explicitly mentioned what the project would do.
2. To be accessible and relevant to people who have no scientific background by using simple language and interesting imagery.
3. To have text that was laid out in an accessible manner and suitable for people with limited English.
4. To have a message written directly to the reader avoiding the use of the passive voice.
5. To have a message that did not include an excess of information but gave options for finding out more.
6. To include imagery that explicitly showed that this was an initiative suitable for those with limited experience of science.
7. To include imagery that would appeal to women and people from ethnic minorities.

The following elements were identified as a requirement in the project description:

- A concise one sentence overview of the workshops.
- A clear description of the goals.
- A description of the activities including details of location, time commitment etc.
- Target audience – we were explicit that no skills were required, or specific knowledge needed.
- Information about how to get further information and join in.
- Details of training given in the workshops and the mention of the possibility of working in collaboration with scientists/experts.
- Details of the benefits to individuals of getting involved in the initiative.
- Details of recognition given for participation.

3.1 PARTICIPANT RECRUITMENT

Let's Go Outside and Learn has an ongoing community focused project in Cranford which aims to encourage the use of green spaces along the river Crane. The organisation also works in other areas of the borough and has a well-developed network of links to other locally based organisations working within the local community.

Local knowledge and networks were used to recruit participants to the project from the target audiences. The team coordinated with local organisations and intermediaries that the potential participants already had a relationship with and a trust in. These included organisations such as Hounslow's Women's Network, the Hounslow Wellbeing Network (a network of organisations that focus on mental health issues), Hounslow Race Equality and Ethnic Diversity Network, Hounslow Disability and Age Equality Partnership, C-Change West London[vi] and Creative Mums (who work with young mothers on Cranford estates).

The team worked closely with Meadowbank Community College[vii] who hosted the workshop activities and promoted the activity to all staff and attendees at the college. They also hosted information sessions for students before the workshops. The Cranford Community Development Officer from the Community Partnership Unit at Hounslow Council also promoted the activities, and the workshops were promoted at the Cranford and Heston Area Forum[viii] prior to the first workshop.

4 FEEDBACK FROM PARTICIPANTS - PROMOTION AND RECRUITMENT

Where did you hear about the workshops?

We asked participants where they had heard about the workshops at the feedback session for the second workshop. The feedback reflected the approach taken to recruit for the project with participants hearing about the workshops through local voluntary sector organisations (newsletters, social media, fliers and through personal recommendations), through friends and family members and through fliers distributed at Meadowbank Community College. Some participants said that they had heard about the workshops via social media, but this is likely to have been generated through organisations that they have a link with. C-Change and the Council development team, for example, have several WhatsApp groups which are used to promote activities in Cranford.

The feedback shows that working with local organisations whose participants have a high level of trust was an effective approach. The feedback also shows that it is necessary to use multiple channels of communication to suit different organisations. The experience of offering information sessions at Meadowbank Community College was useful in that it offered a visible presence and an opportunity to engage with the team on a less formal basis. This had a positive effect on the recruitment with both students and staff attending the workshops.

Where would you look to find this type of opportunity?

We asked participants where they would look for similar opportunities. Feedback reflects the need for a broad approach in promoting citizen science opportunities to attract participants. Suggestions included:

Hard copy - this includes fliers or posters in organisations such as libraries and colleges, magazines, newsletters and blogs produced by trusted organisations that potential participants work with already.

Online media - some participants mentioned social media of trusted organisations or websites that promote events and activities. One participant mentioned that some job sites have links to volunteering opportunities that they have used in the past to look for specific volunteering chances.

Radio – this was suggested as an option by a participant who had experience of promoting projects for a non-environmental project. There are several radio stations broadcasting in different languages in the Hounslow area (Hindi, Polish and Urdu) and Speak Out in Hounslow, a charity for people with learning disabilities, has a radio station which Let's Go Outside and Learn has successfully used to promote activities in the past.

Personal recommendations - participants agreed that hearing about the experiences of others or attending presentations or networking opportunities was a useful way to promote activities. Promotion by or through trusted organisations or an individual that they know, and trust was thought to be the most effective method of recruitment.

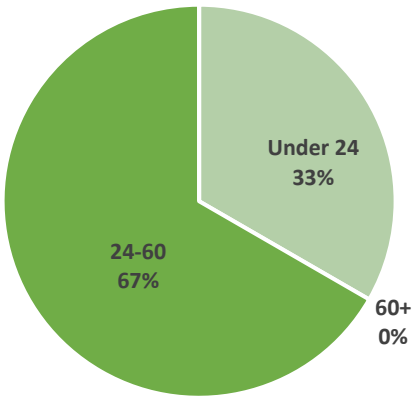
This feedback supports the need for working with organisations trusted by the potential volunteers and the clear role in recruitment/promotion for individuals or organisations known to local people.

5 RECRUITMENT OUTCOMES

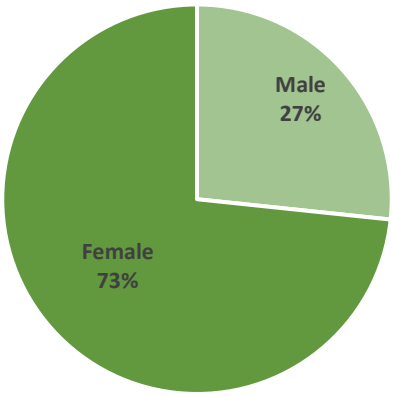
Breakdown of engagement:

Number of registrations for the project	15
Number of attendees - Workshop 1	12
Number of attendees - Workshop 2	10 (9 in person, 1 online)
Number of attendees - Workshop 3	8

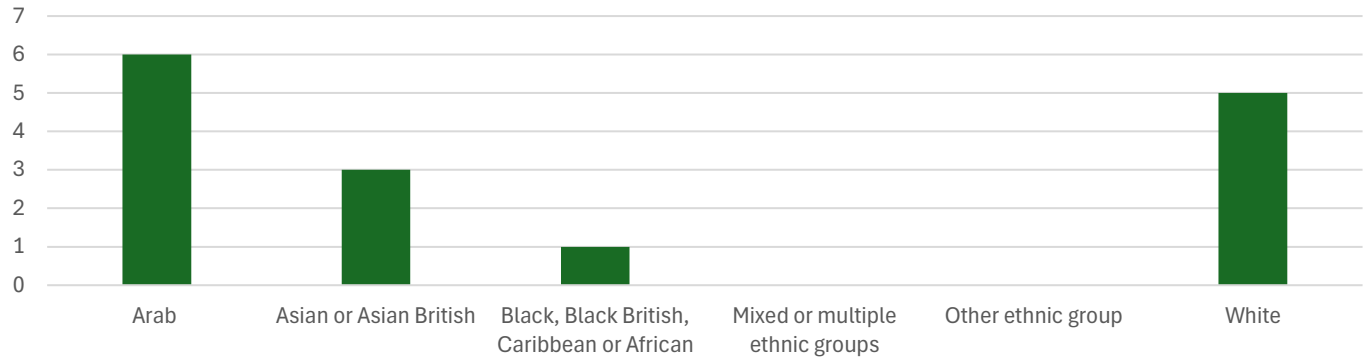
Age:



Gender:



Ethnicity:



Disability:

Wheelchair user	1
Other disability (ADHD)	2

The project sought to recruit 12 participants from the target audiences. Fifteen participants registered for the first workshop, with 12 attending on the day. Demographically, these participants represented several of the targeted groups the project had aimed to recruit, particularly women and those from ethnic minorities.

Most participants were local to Cranford, with many able to walk to the workshops (both at Meadowbank Centre and Waye Avenue Open Space) whilst one participant travelled from Southall but was familiar with the Cranford area. Only one participant was unfamiliar with Cranford having travelled from Wembley. Participants were keen to learn about Citizen Science and how they could apply it to their area and told the team that travel to the workshops was worth their time and effort. A taxi was provided for the wheelchair user to make access to the workshops as easy as possible.

Ten participants attended the 2nd workshop. Of these, nine had returned from the first workshop, with one new participant joining. Most of the non-returners dropped out because they had other commitments. These non-returners were apologetic about not being able to return. The project team ran a separate online workshop for one of the participants who was keen to participate but unable to make the date.

Eight participants attended the 3rd workshop, six of these had returned from the previous workshops with two new participants joining (these were related to another participant). The non-returners between the second and third workshop had other commitments so were unable to make the workshop even though they expressed an interest in doing so.

Attendance register

Workshop Attendance					
Participant	**Gender**	**Workshop 1**	**Workshop 2**	**Workshop 3**	**Total attendance**
1	Female	✓	✓	✓	3
2	Female	✓	✓	✓	3
3	Female		✓	✓	2
4	Male	✓	✓	✓	3
5	Male	✓	✓		2
6	Female	✓	✓	✓	3
7	Female	✓	✓	✓	3
8	Male	✓	✓		2
9	Male	✓			1
10	Female	✓	✓		2
11	Female	✓			1
12	Female	✓			1
13	Female	✓			1
14	Female			✓	1
15	Female			✓	1
Total attendance		12	9	8	29

6 FEEDBACK FROM PARTICIPANTS - MOTIVATIONS AND BARRIERS

As part of the second workshop, participants were asked for feedback relating to their experience of the workshops, citizen science and their perception of the barriers to engaging in the activity. They were asked to discuss the issues in small groups and then fill in the questionnaire. This was followed by a whole group discussion.

Have you ever volunteered for an environmental project?

All but one of the participants told us that they had no previous experience of engaging in citizen science activities, although one participant was able to link some of the surveying methods to curriculum topics learnt at school and another participant had done some practical conservation volunteering activities, which did not include citizen science.

The one participant who did have experience has taken part in ZSL Citizen Crane water monitoring activities over several years. He has recently established the Friends of Avenue Park group in Cranford and he was keen to learn more and broaden his skill set and was using the workshops to understand the range of activities that the Friends could get involved with. This is an opportunity for ZSL to develop a relationship with a local organisation who can potentially recruit citizen scientists for their projects with access to the target audiences.

Many of the participants talked about their volunteering activities with other charities. Some of this experience was substantial and included volunteering four people out of 15 with environmental charities or for environmental causes (London Wildlife Trust, Hounslow's Environmental Champions scheme and litter picking with Cranford Action Group).

Most participants (11/15) had no previous experience of volunteering for an environmental organisation but had experience of volunteering with locally based organisations, who had promoted the workshops or disability organisations. There were a broad range of volunteering activities, some with transferable skills such as filmmaking or developing podcasts.

What attracted you to taking part and why did you want to get involved?

The reasons for taking part were varied but closely reflect research on motivations for participating in conservation volunteering activities.[ix] [x] These motivations can be broken down into six different categories.

- **Interest generated through an appreciation of being outdoors and environmental awareness:** Participants told us that the workshops and citizen science offered the "*chance to be outside*" and would allow them to foster their "*love of nature*" and to "*get to know it better*". Another participant talked about wanting to explore their local area and "*get out more/get to know the local area better*".

  Conversely there was a comment made by a student at one of the information sessions held at Meadowbank Community College who acknowledged the poster for the workshops but said that she would not take part in the sessions as she did not enjoy spending time outside in natural spaces. The team tried to convince her that she could still take part without spending time outside, but she did not participate in the workshops.

  Cultural barriers to spending time outside were studied in a Natural England[xi] report which explored inclusive nature engagement. The report showed that common reasons which can limit opportunities for people from ethnic minority backgrounds to enjoy nature include experiences of unwelcome visibility and racism in natural environments, cultural variation in how people want to spend time outdoors, concerns about 'fitting in', and the free access of dogs in many greenspaces. Let's Go Outside and Learn experience of working in Cranford over the last three years supports this research with, for example, some members of the Goan community unwilling to engage with parks and open spaces because of a fear of catching flu and a deep sense of uncertainty for their personal safety amongst many in the Asian community.
- **Learning, training and skills:** Some participants acknowledged that their motivation to attend was to expand their understanding and knowledge either because it complemented their formal learning "*ties well with school/college subjects*" or informally "*to expand my knowledge and skills*". The opportunity to learn new skills and participate in practical activities was seen to be different to previous opportunities that participants have seen. This is one thing that could be promoted as a benefit for citizen science, particularly with a younger audience looking for new skills and experience to enhance career development.
- **Rewarding attendance:** The workshops offered the opportunity to work towards AQA unit awards in citizen science topics. This was seen to be a significant motivation for attending by most of the participants. Some

said that they would use it in their CV when looking for jobs or to add to their professional development (CPD).

- **Personal contact and encouragement** was identified as a significant motivation for attending and relates closely to the AQA unit award. Some local organisations who promoted the sessions highlighted the invaluable role that Meadowbank Community College and C-Change West London had played in suggesting to individuals that there was benefit for them in attending.
- **Need for activity:** The first workshop was attended by a mother and her two children. She talked about looking for opportunities for regular and meaningful activity that the family could do together that would support the curriculum learning at school and would instil a deeper environmental understanding in the younger generation. Other participants wanted to explore the possibility of new activities that they could take part in on a regular basis.

  "This would be a great future project for classes to be run at Meadowbank to educate learners about biodiversity in the environment and the importance of conservation and creating an overall environment which is healthy and sustainable for all"

  "Thank you for this amazing opportunity and we hope for more of these in the future."

- **Social benefits and feeling part of a community:** This motivation has strong links with the one above and was acknowledged by multiple participants. It was one of the outcomes of the workshops that they enjoyed. "*Meeting likeminded people*" and "*to be part of the local community*" was mentioned as a significant motivation. It may reflect the fact that many participants were already involved in other voluntary sector organisations and have a strong sense of community cohesion.

7 BARRIERS TO ENGAGEMENT

What has stopped you joining in this type of activity before now?

During Workshop 2 the participants discussed the factors that had stopped them from taking part in citizen science activities in the past. Many of the participants volunteer regularly with other organisations so to them, the concept of volunteering was not new. These barriers can be divided into two categories:

7.1 BARRIERS TO GETTING INVOLVED IN CITIZEN SCIENCE INITIATIVES

- **Not knowing what opportunities there are.** The most significant barrier to taking part was identified as lack of information and an uncertainty about where to get information from to enable taking part in citizen science initiatives. Participants also pointed to their own the lack of exposure to, or understanding of, the environment as a barrier to participation and linked this to a lack of information about opportunities.
- **Having the confidence to take part in citizen science initiatives**. Issues about confidence were discussed by the group. Participants discussed how prior to the workshop they had not understood what citizen science was, what was involved or what to expect. They suggested that this lack of knowledge also led to a lack of confidence. "*Being outside is not the barrier, it's the getting there and knowing about sessions*." The group was supportive of the personal stories of one of the participants who had taken part in some citizen science activities as it gave then an insight into the experience of someone they knew. This could be translated into future practice – giving case studies of volunteers' experiences as part of the recruitment process.
  One participant did not return after the first workshop as he believed that after having a better understanding of what citizen science was, he did not feel able to make the commitment.
- **Lack of appropriate knowledge.** There was a suggestion that the participants would not have the skills or knowledge to make a useful contribution to citizen science and that they would need significant support/time to develop their skills and knowledge. "*I would need someone who is able to identify the different species as I might not always know what they are*."

The feedback was that workshops had shown participants that they would be able to make a valuable contribution to citizen science projects and that they had or could learn the skills required. The availability of apps on mobile phones and other hardcopy guides was discussed as well as specific training to enable participation. Participants were supportive of the workshops being offered more widely to encourage a broader participation.

7.2 BARRIERS TO STAYING INVOLVED IN CITIZEN SCIENCE INITIATIVES

- **Cost and transport.** To make the workshops accessible the project funded transport costs for participants including a wheelchair accessible taxi. The participants mentioned that they thought that having their travel expenses and other expenses paid and equipment provided was very useful. This is an important issue if low-income groups are to be more widely engaged in citizen science initiatives or if they have mobility issues.
- **Time.** Distance from home and travel time was mentioned as these two factors impact on the time constraints for some participants. Many participants worked, cared for their families or were in full-time education so the competing demands for time was one of the key barriers to getting involved in citizen science projects. Others have significant commitments to other charitable organisations. Participants told us that they were able to attend as the workshops were well spaced across several months "*I can't commit to regular activities but if there's ones that are not too often, I can try.*"
- **Weather.** Seasonal differences in temperature and bad weather were also seen as a limiting factor to participation. Participants would be more inclined to take part in good weather and in the summer months. This is linked to the cultural barriers discussed above.
- **Lack of facilities/toilets.** Participants considered this to be a significant barrier – a lack of shelter in for bad/hot weather and a lack of toilets was a factor that would significantly discourage participation. It should be considered when choosing sites for activities or arrangements made to overcome the barriers.
- **Concern for personal safety.** Several women in the group expressed concern for their personal safety and said that they would not be happy working alone. They thought that working in a group in the green spaces was a way around this problem but appreciated that occasionally this might be difficult to organise.
  One participant talked about being unwilling to spend time in green spaces by themselves as a fear of their personal safety and discussed "*not wanting to be out alone. I want to be part of a group thing not just for safety but as an opportunity for socialising and meeting others with similar interests and so on*."
- **Physical limitation and accessibility.** Participants talked about the need for citizen science projects to be accessible to those who face physical barriers or have mobility issues. Some participants alluded to the fact that they have physical limitations (including one participant who is a wheelchair user), which impact on their capacity to undertake some citizen science activities. However, generally they did not perceive this as a barrier to participation in the long term though they acknowledged that their involvement may be inhibited or limited in some ways. The participants discussed different roles that people with limited mobility could undertake in the field or elsewhere and discussed how they could benefit from the experience despite disability or limited mobility.
- **Low digital literacy and lack of access to technology.** Hounslow has a high proportion of wards which are amongst the most digitally excluded in England. Some of the participants were concerned about access to online tools and apps. They were interested in low technology solutions and tools that would enable them to take part – recording data on paper and using paper ID charts rather than online apps. This is an area which could be explored further with some of the organisations in Hounslow working to increase digital literacy in the borough including Meadowbank Community College.

8 HOW CAN WE OVERCOME THE BARRIERS?

The participants offered some suggestions as to how some of the barriers could be overcome to encourage greater participation in citizen science. Suggestions included:

- Group sessions so that participants felt part of a team and that everyone was working towards common goals.
- Weekend sessions so that it was possible to participate even if you have work/educational commitments.
- Regular sessions, but with time between ("*weekly is too often due to other commitments*")
- Plenty of advance notice so that engagement can be planned into other commitments.
- Work on accessible sites with facilities such as toilets and shelter.
- Work to make the sessions accessible to people who face physical disabilities and make opportunities for including them in the activities.
- Pay costs such as transport so that participants are not out of pocket.
- Participants thought that to encourage more people into citizen science it should be easier to find out about how to get involved. They stressed the need to promote activities regularly as not knowing about events is a significant barrier. "*Currently there is not one single resource that shows all events or opportunities. There are multiple smaller calendars/sites but they don't always mention citizen science activities. It is difficult to know where to look. Having a calendar/site where everything is in one place would be great*." and "*Websites can sometimes be confusing for volunteers and could be more user friendly to be as clear and accessible as possible".*
- Use of short informative videos (such as TikTok /Instagram Reels) to encourage engagement or develop a skill.

9 LESSONS LEARNT AND RECOMMENDATIONS

An investment in eye-catching promotional material was useful in gaining the interest in partner organisations and others. It was important that the material is accessible and gives all the relevant information but also offers the opportunity to find out more by using a named individual.

Not knowing what opportunities there are to get involved with is the most significant barrier to taking part. Lack of information and an uncertainty about where to get information from to enable participation was the most significant barrier identified by the participants at the workshops.

In an urban environment a lack of exposure to, or understanding of, the environment was also identified as a barrier to participation. An introduction to the local green spaces was an important part of encouraging citizen science initiatives in an urban environment.

Taster sessions are an opportunity to provide those who are not familiar with citizen science a chance to see whether citizen science interests them and what it involves. This is potentially important in reaching a more diverse range of volunteers who may not be aware what citizen science is or what the opportunities for taking part are. The participation of ZSL and other experts/scientists was viewed positively by participants.

Effective engagement planning to ensure a diverse range of people can get involved is an important aspect of broadening participation in initiatives, so it is important to have a community engagement plan to target the audience that you wish to reach. This planning should include:

- The use of different methods of communication to reach your proposed audience including case studies, film, radio and social media as well as hard copies placed in places where communities meet.
- Make the communication as accessible as possible for people who may not have English as a first language or any knowledge of science.
- Working closely with organisations (e.g. social care organisations, community organisations, colleges and community development teams) who have the trust of local people. This was a significant recruitment tool for the workshops and enabled the wider promotion of the opportunities for the citizen science workshops.
- Offer some incentive for taking place that will allow participants to evidence their attendance.

It is challenging to engage vulnerable groups. People with special needs, disabilities, younger or older groups, as well as citizens with migrant backgrounds and other forms of social vulnerability often face greater barriers to accessing

volunteering opportunities. For example, the problem of inclusion can come from difficulties in using particular technologies, speaking a particular language or physical access to the outdoors. Addressing these issues requires the provision of alternative forms of engagement tailored to the specific needs of these vulnerable groups. Working with participants to co-design their practical workshop meant that we could be as inclusive as possible. Unfortunately, this strategy may not always be feasible due to limitations in the project's available resources.

It is important to emphasise the benefits to the volunteer of their involvement in a citizen science initiative – these benefits are similar to any volunteering scheme but the potentials for new skills and knowledge as well as the opportunity to meet likeminded people were identified as significant benefits by participants.

10 STRATEGIES FOR DIVERSIFYING CITIZEN SCIENCE ENGAGEMENT

Options for diversifying recruitment could focus on different ways of developing projects. These include:

- Constructing citizen science project around specific communities as we did in Cranford. These projects could reflect the demography of the area where the project took place, the languages and priorities of communities. It would require a good understanding of the community to be able to develop projects on these terms,
- Reducing barriers to participation by providing alternative means of engaging and participating e.g. both online and hands-on ways. The disabled participant and women with children both highlighted this as a potential model for engagement.
- Providing role models from underrepresented audiences and using recruitment strategies specific to diverse audiences.
- Engaging younger audiences than have been traditionally recruited as well as engaging with families.
- Offering incentives that demonstrate engagement in the activities would offer a good motivation to engagement.

11 FEEDBACK FROM PARTICIPANTS - BENEFITS TO CITIZEN SCIENTISTS

Feedback suggests the idea that doing citizen science with diverse urban communities might have a greater impact for participants than for science, as scientific achievements were not among the most important impacts highlighted by participants. They were able to identify a range of benefits outlined in the table below.

"I had a really wonderful time with all the Volunteer citizen scientists. The day was amazing fun! …Thank you so much for arranging the session. As a Volunteer it was a really educational, fun and interesting experience. I got to learn and understand all about the biodiversity around me and I got to appreciate really how complicated and intricate our environment and local area is.

We discovered mini beasts that I have only read about in books. We got to experience nature first hand and so close to home! It was lovely to collect and analyse the sample data and using the equipment was a good adventure."

There was also a suggestion that the taster sessions should be more widely available and that they have a role to play in changing behaviour *"The course itself really needs to be rolled out to all the residents of the neighbourhood… I don't think the residents really understand how blessed they are to have so much going on around them and so much that they could be getting involved with to improve the local area and environment!*

Truly, we can observe that people don't really appreciate and contemplate the knock-on effects of climate change and the effects of not looking after, monitoring and encouraging biodiversity in the environment when living in an urban and built-up environment."

"I would love to get involved in projects where we could re- introduce nature to local areas and unused open land and unkept open spaces- All the land where neither Hounslow highways bears responsibility and neither Private landowners needs to be monitored and brought back to life. There are lots and lots of areas around LBH where future projects could

have a massive impact on the quality of life of local residents. I hope data sampling would be a means of providing and promoting statistical evidence to support such arguments."

11.1 Feedback from Workshop 3 Practical Session

The participants appreciated having the mix of indoor sessions as well as outdoor where they were able to put their planning into practice and see firsthand concepts, methods etc that had been discussed.

"*This outdoor session has taught us newfangled things such as the condition of different parts of the river and how humans have affected the habitats of the river through creatures. We learned about invasive species like the Himalayan balsam and lots more!"*

"*I feel I learn better as an individual when I'm practically getting 'my hands stuck in' and the last day of the course was the perfect example of this. As a kinaesthetic learner the kick sampling activity really was a great experience to practically understand all about nature in the local environment. To discover and learn about things which I was previously oblivious about*."

Whilst gaining practical experience was an important part of the day, the group was able to bond and work together cohesively, most having not known each other before the workshops, which many felt was just as important.

"We, as a group also spent a great time outdoors together bonding as well as learning. "

"All the volunteers were all fantastic and everyone got stuck in with data gathering. I noticed how everyone had a fun morning discovering new things."

For some, it was a combination of learning new skills/ gaining more knowledge on Citizen Science as well as sharing common goals of getting more people immersed in nature, being around likeminded people.

"I wanted to thank you for the informative session about Citizen Science, I personally learnt a lot. I also wanted to thank you for sharing your knowledge of conservation and goal of bringing more people out into nature."

A number of participants were vocal about opening up Citizen Science to teenagers/young people as a means of getting them away from video games/technology and into nature, as well as allowing them to partake in Citizen Science as a family activity.

"*here is one thing we would love you to improve, and that is so that under 18 year olds, such as perhaps over 16 could also take part in the water activities. So they can enjoy participating as well as just watching. It would be lovely if there would be a form for maybe parents to sign on behalf of the under eighteens*."

11.2 Table showing benefits to volunteering for citizen science

Benefits to society	Social capital, community development Social Inclusion Environmental understanding and access to nature Pro-environmental behaviour Pro-social behaviour
Benefits to organisations	Increases capacity Volunteers become ambassadors for the organisation Connects people to the environment
Benefits to individual	New skills, learning and knowledge Increased scientific literacy and understanding Well-being – physical, mental and social

	Feel part of a wider community Social connectedness Rootedness to specific places Pro-environmental behaviours and attitudes Increased feelings of responsibility and success Social and economic empowerment
Benefits to communities	Pride in local community and green space Community cohesion Stimulate local action in green spaces Building and strengthening local partnerships and networks
Benefits to the environment	Greater understanding of local biodiversity Increased capacity for scientific enquiry
Adapted from Environmental volunteering: motivations, barriers and benefits Liz O'Brien, Mardie Townsend and Matthew Ebden (July 2008) https://cdn.forestresearch.gov.uk/2022/02/env_volunteering_full_report.pdf	

12 PHOTO RECORD OF SESSION 3 PRACTICAL WORKSHOP

Workshop 3: Activity introduction

Workshop 3: Exploring the river

Workshop 3: Discussing findings

Workshop 3: Identifying species from kick sampling

13 DATA SHEETS FOR SESSION 3 PRACTICAL WORKSHOP

Invertebrate Recording Form

Date: _____ Time: _____ Location: _____ Group: _____

Sample 1		
Invertebrates	**Number**	**Notes**
Sample 2		
Invertebrates	**Number**	**Notes**
Sample 3		
Invertebrates	**Number**	**Notes**

Transect Survey of the Riverbank

River Features

	Section 1	Section 2	Section 3
River width	___cm	___cm	___cm
Bank Width	___cm	___cm	__cm
Water depth	___cm	___cm	___cm
Riverbed substrate	◯ Mud/Silt = ____% ◯ Sand= ____% ◯ Small gravels = ____% ◯ Large Gravels = ____% ◯ Rocks/boulders = ____% ◯ Man-made (e.g. bricks) = ____% ◯ Other = ____%	◯ Mud/Silt = ____% ◯ Sand= ____% ◯ Small gravels = ____% ◯ Large Gravels = ____% ◯ Rocks/ boulders = ____% ◯ Man-made (e.g. bricks) = ____% ◯ Other = ____%	◯ Mud/Silt = ____% ◯ Sand= ____% ◯ Small gravels = ____% ◯ Large Gravels = ____% ◯ Rocks/boulders = ____% ◯ Man-made (e.g. bricks) = ____% ◯ Other = ____%
Flow speed	◯ Slow walk ◯ Brisk walk ◯ Jog ◯ Sprint	◯ Slow walk ◯ Brisk walk ◯ Jog ◯ Sprint	◯ Slow walk ◯ Brisk walk ◯ Jog ◯ Sprint
Man-made features	◯ Concrete walls ◯ Wooden toe boarding ◯ Other: _____	◯ Concrete walls ◯ Wooden toe boarding ◯ Other: _____	◯ Concrete walls ◯ Wooden toe boarding ◯ Other: _____

Vegetation Features

	Section 1	Section 2	Section 3
Invasive species	◯ Absent ◯ Present – if yes which species: _____	◯ Absent ◯ Present – if yes which species: _____	◯ Absent ◯ Present – if yes which species: _____
Overhead vegetation cover	Percentage canopy cover = _____%	Percentage canopy cover = _____%	Percentage canopy cover = _____%
Bank vegetation cover	Percentage bank cover = _____%	Percentage bank cover = _____%	Percentage bank cover = _____%
In-channel vegetation cover	Percentage in-channel cover = _____%	Percentage in-channel cover = _____%	Percentage in-channel cover = _____%
Types of vegetation	• Species 1 = _____ • Species 2 = _____ • Species 3 = _____ • Species 4 = _____ • Species 5 = _____	• Species 1 = _____ • Species 2 = _____ • Species 3 = _____ • Species 4 = _____ • Species 5 = _____	• Species 1 = _____ • Species 2 = _____ • Species 3 = _____ • Species 4 = _____ • Species 5 = _____

Environmental Degradation

	Section 1	Section 2	Section 3
Pollution	◯ Visual signs of water pollution (grey water, oily surface etc.) ◯ Smell of pollution ◯ Litter (if so what type): _____ ◯ Other signs: _____	◯ Visual signs of water pollution (grey water, oily surface etc.) ◯ Smell of pollution ◯ Litter (if so what type): _____ ◯ Other signs: _____	◯ Visual signs of water pollution (grey water, oily surface etc.) ◯ Smell of pollution ◯ Litter (if so what type): _____ ◯ Other signs: _____

Biodiversity

	Section 1	Section 2	Section 3
Dragonflies	Total Number: Species:	Total Number: Species:	Total Number: Species:
Damselflies	Total Number: Species:	Total Number: Species:	Total Number: Species:
Birds	Total Number: Species:	Total Number: Species:	Total Number: Species:
Butterflies	Total Number: Species:	Total Number: Species:	Total Number: Species:

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Let's Go Outside and Learn are grateful to the Zoological Society of London for the opportunity to work with them to develop this initiative. We are particularly grateful to Azra Glover for her enthusiasm to develop the initiative and photographs of Workshop 3. We are also very grateful to Meadowbank Community College for their help and support in delivering the first two workshops and their enthusiasm for the initiative.

It was a pleasure to meet and work with so many enthusiastic volunteers and we wish them good luck in their future careers in citizen science.

Let's Go Outside and Learn

Let's Go Outside and Learn CIC works in the London Boroughs of Richmond and Hounslow to introduce people living in an urban, built-up environment to their local open spaces. We target people at risk of isolation and show the benefits that the natural environment can bring to improved health and wellbeing, by bring people together to learn, socialise and to feel part of their community.

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ZSL

The Zoological Society London is a global science-led conservation organisation helping people and wildlife live better together to restore the wonder and diversity of life everywhere. We believe that communities, motivated by a passion for their local environment, have an essential role to play in nature recovery. We are committed to building capacity and empowering diverse communities to impact transformational change to nature in London.

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