



Festival of Nature. Credit: Bristol Natural History Consortium

BioBlitz: Promoting cross border Research and collaborative Practices for Biodiversity Conservation

Advances in Citizen Science: the BioBlitz Approach

Citizen Science approaches - the involvement of non-professionals in scientific research - are increasingly effective and relevant sources of data for improving knowledge of biodiversity, whilst simultaneously increasing public engagement in science¹. Among the vast array of tools available in environmental Citizen Science, BioBlitz events are being adopted as an effective methodology for conducting a rapid assessment of biodiversity, thus contributing to the evidence base for managing and preserving biodiversity and ecosystem services².

This policy brief has been developed with contributions from a vast network of BioBlitz organisers internationally. It aims to inform policy and decision-makers including public administration, local authorities and donors, on the BioBlitz approach and its potential for achieving local and national biodiversity goals. By showcasing initiatives implemented in Europe, this document highlights the potential of a BioBlitz to make a valuable contribution to science, environmental management, policy and public engagement. It concludes by advocating for the BioBlitz approach and proposing the establishment of an EU wide network of practitioners and BioBlitz organisers to foster cross border research and collaboration in biodiversity conservation. This policy brief is developed within the framework of the Horizon 2020 'Doing It Together Science' (DITOs) project to establish a collaborative and open network between DITOs partners, external organisations and policy-makers throughout Europe.

What is a BioBlitz?

During a BioBlitz event (from Bio = life and Blitz = something quick and intense) members of the public, professional scientists and voluntary naturalists work together to record as many species as possible within a delimited geographical area over a defined time period. The first BioBlitz was organised in Washington D.C. in 1996 by the National Park Service and the National Biological Service, both part of the U.S. Department of the Interior. Ever since, BioBlitz has become a very common approach especially in the USA, UK and Australia.

Case study 1 - UK National Network and Defra

The UK Department for the Environment, Food and Rural Affairs (Defra) is a member of Bristol Natural History Consortium (BNHC), the charitable partnership that coordinates the National BioBlitz Network for the UK³. Since 2010, Defra has supported a number of research and development activities around BioBlitz, recognising the potential of the format to deliver priorities for the UK Government Biodiversity 2020 Strategy⁴ which states that: *"By 2020, significantly more people will be engaged in biodiversity issues, aware of its value and taking positive action"*. BioBlitz offers specific opportunities to support two of the key themes: putting people at the heart of policy and improving knowledge.

To a smaller extent, BioBlitzes are being carried out in other European countries in a constantly increasing trend, as Citizen Science popularity increases, even in countries with little tradition of public participation in science.

Commonly, the event is organised as a 24-hour blitz to create a broad biodiversity inventory of a geographical site. If the goal is to capture a snapshot of a target species or ecosystem, a shorter 'mini-BioBlitz' (three hours to half a day) is an adequate format. The typical short time frame of this event delivers rapid datasets providing a complementary approach to long-term inventories and contributing to reporting progress towards national targets as well as informing decision-making processes. This versatility means BioBlitzes can make a meaningful contribution to a number of EU environmental policy areas such as marine biodiversity monitoring and invasive alien species (IAS).



Marine and coastal BioBlitz events organised by the MBA with several partners. Credit: Marine Biological Association.

Case study 2 - BioBlitz in Marine and Coastal Habitats

In 2009, the Marine Biological Association (MBA) and the Natural History Museum London led the first UK marine and coastal BioBlitz. Combining marine, land and freshwater surveys shows the connection between systems often considered in isolation and brings together people from a range of disciplines. Work in the marine environment presents a number of unique challenges, but with the help of experienced partners and appropriate planning these can be overcome. Activities such as shore surveys, ocean vigils, and strand-line walks can be safely undertaken by most people. Marine BioBlitzes provide important biodiversity data, helping to fill the 'major knowledge gap in the marine environment' identified by the European Biodiversity Strategy mid-term review⁵. Many events occur at Natura 2000 sites and fill distribution points for common, but under-recorded species, non-natives and protected species and features.



Invasive alien seaweed found during a BioBlitz. Credit: Marine Biological Association

Case study 3 - BioBlitz and Invasive Alien Species

The EU Regulation on the prevention and management of invasive alien species (IAS) requires 'Member States to determine the presence and distribution of new as well as already established IAS of Union concern'. By the nature of the BioBlitz format, new distribution records of IAS are often made, making a valuable contribution to science as well as environmental management as required by the Marine Strategy Framework Directive and Water Framework Directive. Globally, there are cases of BioBlitz events that have been successful in specifically targeting only IAS⁶. The Marine Biological Association encourages participants to survey IAS by scheduling IAS surveys during events. Data can then be analysed against IAS registers to identify the proportion of IAS vs. non-IAS for a site, to indicate the level of ecosystem alteration. Records can be passed quickly to relevant authorities for action using systems such as the Great Britain Rapid Response Protocol operated in the UK⁷.

Usually delivered by partnerships of academia, natural history or science museums, education institutes and NGOs, BioBlitz events are an opportunity to collaborate with stakeholders who are usually not directly involved in conservation, therefore promoting interdisciplinary collaboration and increasing opportunities to support campaigns to protect the local environment. Citizen Science practitioners globally have shared their experiences and designed user guides to running a BioBlitz^{8,9}, enabling the sharing of good practices between countries and encouraging new BioBlitz organisers to implement this activity.

Technology-enabled Biodiversity Monitoring

Engaging the public in mapping species is becoming an easier task thanks to advances in technology. However, when involving non-professionals in collection of biodiversity data, the quality of the data collected is an issue to be addressed. Developments of tools such as web platforms and mobile apps to record data from the field (e.g. iNaturalist, IAS Europe, Natusfera, iRecord, BioDiversity4All) are quickly moving forward in response to this challenge. The use of accessible technologies facilitates inclusiveness as well as processes for data quality control. Uploaded observations containing a photograph of the species, date and location information, are made available in real-time, thus enabling verification by experts at any time and with an increased speed of data sharing. BioBlitzes can contribute observations to national and international biodiversity databases, allowing their use to answer large-scale scientific and management questions.



BioBlitzBcn - Spain. Credit: Dacha Atienza Ariznavarreta

Case study 4 - BioBlitz Barcelona (BioBlitzBcn)

The BioBlitzBcn started as an initiative of the University of Barcelona and the Barcelona City Council in 2010 with the aim of increasing awareness of urban biodiversity. The City Hall of Barcelona has partially funded the first five editions in agreement with the Natural History Museum of Barcelona and the resulting datasets are submitted to the local agency of environmental affairs. The selection of locations for the BioBlitzBcn has focused on big urban parks to create a biodiversity inventory according to the needs of the Barcelona environmental agency. Data collected from 2010 to 2014 have been compiled and published in the Global Biodiversity Information Facility (GBIF), which is a free and open access database for biodiversity data¹⁰.

Case study 5 - Island BioBlitz: celebrating Ireland's Island Biodiversity

The National Biodiversity Data Centre organised a week-long Island BioBlitz in 2016 to engage the local community in the celebration of Ireland's natural heritage and to generate inventories of the biodiversity of each island. Teams of experts, citizen scientists and locals documented the biodiversity of the 5 offshore islands¹¹. A unique feature of the event was that teams competed against each other to see which island could document the most species. To support the event, the Data Centre developed a state of the art online and mobile phone app to enable the data to be captured in real time and results streamed live. All data collected as part of Island BioBlitz have been validated and are freely available for download¹² and through GBIF. The island communities have taken ownership of the results to promote the unique natural heritage of their areas.

Background: The need for Monitoring Biodiversity

Biodiversity is threatened by the effects of human activities on the environment such as climate change, habitat loss and introduction of IAS. The value of biological diversity has been recognised in legal instruments such as the Convention for Biological Diversity¹³ adopted by 196 countries worldwide. The framework, provided in the ten-year strategic plan for 2011-2020, includes the Aichi Biodiversity Targets and is reflected in the EU 2020 Biodiversity Strategy and translated into national strategies¹⁴. EU Institutions and Member States are responsible for ensuring that objectives are achieved by 2020. The EU Strategy sets out actions and horizontal measures needed to reverse loss of biodiversity, and includes built-in measures such as the Natura 2000 network to improve the implementation of the Birds and Habitats Directives. Measuring the success of these strategies is essential and one vital step in this process is effective monitoring of biodiversity to which BioBlitzes can contribute.

Case study 6 - BioBlitz in Natura 2000 sites in Italy

The Maremma Natural History Museum (Tuscany, Italy) has organised 24-hour BioBlitzes since 2013 to raise awareness of biodiversity and generate species inventories for the selected areas¹⁵. The events are held in Natura 2000 sites to allow the promotion of the network of protected areas at the local scale while contributing to updates of knowledge useful for Bird and Habitats Directives' reporting. More than 1000 citizens actively took part in the events between 2013 and 2016 and about 30 sessions of data collection were carried out in each BioBlitz. The first two BioBlitzes were organised in the 'Oasi di San Felice' (a large Mediterranean pinewood, with sandy dunes and riparian vegetation) in agreement with Allianz Insurance, owner of the reserve, who funded the event and provided visibility at the national and international levels.

Added Value and Outcomes of BioBlitz: Public Engagement with Science and Policy

A BioBlitz is a process whereby the knowledge gained by the participants and the scientists creates sustained awareness and commitment to address environmental issues.

1) Individual and Community Outcomes

BioBlitzes empower individuals and communities to take action to protect the environment. They can help address issues of concern for communities such as biological invasions or air quality by using bioindicators. Participation in BioBlitzes can also improve the sense of being part of a local area and develop community cohesion.

2) Scientific and Environmental Outcomes

Data collected during a BioBlitz can be used for research such as updating species lists and documenting the occurrence of rare species (Case study 7, 8). It is not a replacement for a professional ecological survey as the outcome depends on the methods used and the expertise available on the day. Nevertheless, a BioBlitz attended by professional experts offers opportunities for skills development in surveying and identi-

fication; fosters collaboration and networking; strengthens connections between professionals; whilst contributing data towards more long-term surveying efforts.

3) Policy and Management Outcomes

BioBlitzes have the potential to inform policymaking, but these links can be enhanced. When a BioBlitz is able to give answers to community concerns, the policy outcomes of these events become even stronger. A BioBlitz can launch campaigns on environmental issues relevant at local scale or contribute knowledge addressing larger-scale challenges. For instance, the detection of IAS helps track their occurrence and distribution and reduces time of action with real-time notification to government agencies (Case study 3). In many cases BioBlitz events are held in protected areas (Case study 6), contributing data to inform management interventions and to support monitoring and reporting of environmental legislation.



Rare species *Xyleborus monographus* found during a BioBlitz in Bristol (UK). Credit: Mark Telfer.

Case study 7 - Rare Species Discovered at Bristol BioBlitz¹⁶

The rare bark beetle *Xyleborus monographus* was spotted at the 2015 Bristol BioBlitz and confirmed by experts to be previously recorded only four times in England and never before in the South West. Scientists reported that likely the beetle had only been in England since 2003, when it was first recorded, having travelled from Europe. The discovery showed a potential new location indicating the need for further research at the site. As reported by a scientist involved at the event: "BioBlitz shines a spotlight on sites of interest, enabling an intense, quick study which tells us whether more work should be done to establish their importance. It shows people that even on your own doorstep you can find an incredible amount of wildlife and how wildlife populations are changing very rapidly in response to threats like climate change".

Case study 8 - Alexandra Palace Park BioBlitz, London

The Natural History Museum in London has led a series of 24-hour BioBlitzes across southern England. The Alexandra Palace Park BioBlitz was held in 2010 in partnership with the British Broadcasting Company, local council and site managers. It attracted over 8000 members of the public and recorded over 700 species including a regionally important area of acid grassland, the fourth UK record of a rare variety of a *Bolbitius fungus*, and the rarely recorded red data book beetle *Amphotis marginata* - only the second reported occurrence in the UK since 1969. There was also a discovery of male and female stag beetles, *Lucanus cervus*, the first time this Biodiversity Action Plan species had been recorded in the park. The event

contributed to both site management and conservation¹⁷. The local Council and Friends of Alexandra Palace Park used the data to begin the process of applying for the park to be designated as a local nature reserve (granted in 2013).

How to increase BioBlitz Impact: Fostering Networking and Capacity Building

Many BioBlitz events are held within Europe with little cross-boundary exchange of experience, resulting in a missed opportunity to maximise the impacts and outcomes of this approach. With BioBlitzes becoming more and more popular, research is needed to identify good practices that take into account citizens', researchers' and policymakers' priorities. Establishing a BioBlitz multi-actor framework would make it possible to better align priorities and needs of stakeholder groups. The European Citizen Science Association (ECSA) was established in 2013 to foster the potential of Citizen Science with regard to environmental sustainability and policy making. One of its goals is to support such a movement by providing opportunities for networking and exchange of knowledge, aiming to consolidate the European network and making it sustainable in the long-term.

There is a need to facilitate the sharing of best practices and to build capacity for BioBlitzes:

- To promote cross-border research and cooperation and the implementation of BioBlitzes to achieve a wide range of desirable outcomes.
- To further develop the potential of BioBlitz to be temporally repeated monitoring events.
- To enhance the potential of this approach to support the implementation of local, national and international biodiversity strategies and to inform decision-making processes.
- To advocate and provide support for taxonomists to attend, develop their own skills and to support post-event follow up.
- To encourage the growing interest in schoolyard BioBlitzes and other outdoor educational curricula to increase social commitment to the study and conservation of nature.

Thus we recommend the establishment of a Europe-wide network of BioBlitz stakeholders

How to Cite

DITOs consortium, (2017). *BioBlitz: Promoting cross border Research and collaborative Practices for Biodiversity Conservation*. DITOs policy brief 1.

References

- 1 Science Communication Unit University of the West of England, 2013. *Science for Environment Policy. In-depth Report: Environmental Citizen Science*, Bristol.
- 2 Chandler M. et al., (2017). *Involving Citizen Scientists in Biodiversity Observation*. In *The GEO Handbook on Biodiversity Observation Networks*. Springer International Publishing, pp. 214-218.
- 3 BioBlitzUK, (nd). Available at: www.bioblitzuk.org.uk
- 4 Defra, (2011). *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. London: Department for the Environment, Food and Rural Affairs.
- 5 *Biodiversity Information System for Europe*, (nd). Available at: <http://biodiversity.europa.eu/mtr/biodiversity-strategy-plan/eu-mid-term-review-for-horizontal-measures>
- 6 Schwörer, T., et al., (2012). *Managing Invasive Species: How Much Do We Spend?*. Alaska SeaLife Center. Available at: https://scholarworks.alaska.edu/bitstream/handle/11122/3919/2012_07-InvasiveSpecies.pdf?sequence=1
- 7 GB Non-native species secretariat, (2017). Available at: <http://www.nonnativespecies.org/alerts>
- 8 Robinson L. et al., (2013). *Guide to running a BioBlitz*. Natural History Museum, Bristol Natural History Consortium, Stockholm Environment Institute York and Marine Biological Association.
- 9 Hepburn L. et al., (2015). *The Australian Guide to Running a BioBlitz*. Atlas of Life, Atlas of Living Australia, Great Barrier Reef Foundation, Office of Environment and Heritage, Queensland Museum, Australian Government, Inspiring Australia.
- 10 Atienza, D. et al., (2015). *Volunteers prospecting the biodiversity of Barcelona: a summary of the first five editions of BioBlitz BCN (2010-2014)*. Natural History Museum of Barcelona.
- 11 BioBlitz Celebrating Ireland's Wildlife, (2017). Available at: <https://bioblitz.ie>
- 12 National Biodiversity Data Centre, (nd). Available at: <http://maps.biodiversityireland.ie>
- 13 Secretariat of the Convention on Biological Diversity, (1993). *Convention on Biological Diversity*. UNEP
- 14 EU Commission, (2011). *Our life insurance, our natural capital: an EU biodiversity strategy to 2020*. COM (2011).
- 15 Sforzi A. et al., (2013). *Report del primo BioBlitz della Toscana*. Allianz, Museo di Storia Naturale della Maremma, Fondazione Grosseto Cultura.
- 16 BNHC, (nd). *Rare beetle discovered at Bristol BioBlitz*. Available at: <http://www.bnhc.org.uk/rare-beetle-discovered-bristol-bioblitz>
- 17 Alexandra Palace Park Board, (2012). *Alexandra Park Management Plan 2008-2018*. Heritage Lottery Funded. Available at: <http://www.alexandra-palace.com/content/uploads/2012/05/Alexandra-Palace-Park-Management-Plan-Summary-2012.pdf>

Colophon

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