

## **Supplementary material A**

### **Additional Information on BioBlitzes**

#### **General information**

BioBlitzes are typically described as "a collaborative race against the clock to discover as many species of plants, animals and fungi as possible, within a set location, over a defined time period" [Robinson et al., 2013], and are often used as public engagement events.

BioBlitzes are usually a combination of wildlife experts and members of the public working together [da Silva, 2018; Hartry et al., 2017]. BioBlitz data generally does not produce the same taxonomic specificity as longer-term surveys and tends to be biased towards large, colourful and slow-moving species [da Silva, 2018; Foster et al., 2013], yet many scientists acknowledge that BioBlitzes can contribute to biodiversity assessments and monitoring. Since BioBlitzes engage non-expert audiences, and aim to engage and educate the public, some proponents described BioBlitzes as "part contest, part festival, part educational event, part scientific endeavor" [Baker et al., 2014, p.39], illustrating the multitude of purposes of BioBlitzes. However, while some suggest the "...emphasis on education and outreach need not be considered a fatal flaw for a BioBlitz; indeed, it is a commendable feature of most of them" [da Silva, 2018, p. 26], others may see it as a distraction from the scientific goals of the event.

#### **The Natural History Museum-led BioBlitzes in this study**

This study collected observational data from 15 BioBlitzes across three Natural History Museums in Los Angeles, San Francisco, and London. None of the BioBlitzes in this study lasted for the full 24 hours as BioBlitzes do traditionally; since they were much shorter, they fall in the category of "mini-BioBlitzes" [DITOs Consortium, 2019]. These three NHMs each have been leading citizen science events and programs for a decade or more, with differing approaches, and so provided both quantity and variety of events to allow us to examine youth participation. The citizen science leads at each NHM selected BioBlitz events from their regular programming for this study, based on each event's outreach strategy, RSVP's, and/or relationships with involved partner organisations, that were likely to be attended by at least some young people within our target age range (5-19 years old). The events took place during Spring and Summer 2018 ; they lasted 2-9 hours, most typically 3-4 hours. Twelve of the BioBlitzes used the iNaturalist app to submit biodiversity observations as photo evidence and location data to a database and potentially to GBIF. The others relied on recording sheets submitted (without photo evidence) to museum staff. BioBlitz events took place at various locations, for example, within museum grounds, public parks and natural reserves. Some events were organised with stewardship organisations, land managers or other environmental groups. Events attracted between 10 and 900 participants; the numbers of youth under 20 years old varied between six and more than 500. Some BioBlitzes kept the whole group together

during an introduction, biodiversity surveying activities and wrap-up session, whilst others offered guided and self-guided drop-in activities throughout the event.

While the overall goals and parameters of BioBlitzes described above applied to all the events in our study, each of the three NHMs had different specific approaches, local habitats, and levels of attendance that provided a rich variety of contexts in which to study youth participation, which we describe briefly:

#### Natural History Museum of Los Angeles County<sup>1</sup>

Events were typically held at a local park or beach, where participants had the option to engage in documenting biodiversity or other nature-themed activities, like puppet shows or wildlife presentations. NHM staff lead activities and iNaturalist was used for recording observations.

#### California Academy of Sciences<sup>2</sup>

Events were typically held at parks or open spaces throughout the San Francisco Bay Area, with one or two partner organizations co-leading with staff from the California Academy of Sciences. At these events, the only organized activity was to explore the natural space in order to record biodiversity using iNaturalist.

#### Natural History Museum London<sup>3</sup>

Events were typically larger in attendance than the other two NHMs, and had scheduled events throughout the day, including pond dipping, searching for bugs, and looking for earthworms. Data were recorded on pre-made recording sheets, which could then be submitted to the NHM staff, though participants were encouraged to use iNaturalist during some of the events.

## References

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<sup>1</sup> <https://nhmlac.org/community-science> (no dedicated Bioblitz website but specific events are listed in the calendar)

<sup>2</sup> <https://www.calacademy.org/citizen-science/bioblitzes>

<sup>3</sup> <https://www.nhm.ac.uk/take-part/citizen-science/bioblitz.html>

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