***PanEnvironment - COVID19 effects on biodiversity citizen science participation***

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**Datasets:** iNaturalist, USA National Phenology Network, eButterfly, eBird (in the works)

**Geographic Scales:** Global: iNaturalist, Continental (North America): iNaturalist, eButterfly, National (USA): iNaturalist, USA-NPN, eButterfly

**Temporal Period:** 2018-2020 Mar 01 - May 31

**Questions:** How does COVID19 impact % change in observations recorded and % change in unique observers participating during the months of Mar, Apr, and May (combined) between 2018-2019 to 2019-2020?

**Data Downloads:**

iNaturalist - KLP downloaded data from GBIF (www.gbif.org) on , DOI: <https://doi.org/10.15468/dl.4prgpy>

USA National Phenology Network - TC downloaded data from database on 2020 Jul 28 File: 2018-2020-npn-records-spring-usa.csv and 2018-2020-npn-observers-spring-usa.csv

eButterfly - KLP download data from database on 2020 Jul 10 File: 2018-2020-ebutt-spring-noram.csv

**Data Access Citations:**

GBIF.org (29 July 2020) GBIF Occurrence Download <https://doi.org/10.15468/dl.4prgpy>.

Ueda K (2020). iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset <https://doi.org/10.15468/ab3s5x> accessed via GBIF.org on 2020-07-31.

USA National Phenology Network. 2020. Plant Phenology Data. Individual Phenometrics, 03-01-18 to 05-31-20 for the United States. Data set accessed 7-28-20. <http://doi.org/10.5066/F78S4N1V>

eButterfly. 2020. eButterfly: An online database of butterfly distribution and abundance [web application]. Available: <http://www.e-butterfly.org>. (Accessed: Date 2020 Jul 10).

Prudic, K. L., McFarland, K. P., Oliver, J. C., Hutchinson, R. A., Long, E. C., Kerr, J. T., & Larrivée, M. 2017. eButterfly: leveraging massive online citizen science for butterfly conservation. Insects, 8(2), 53. https://doi.org/10.3390/insects8020053

**GitHub Repository:** <https://github.com/Big-Biodiversity-Collaborative/PanEnvironment>

**Statistical Reporting:**

From the summary table we will ask you to report a % change in the response of interest versus a suitable reference (and 95% confidence intervals), as well as the t-statistic and df (we will just ask for a screen shot of the summary table). Score your result as being attributable to changes in human activities due to the lockdown on a scale of low, medium and high

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Data** | **Response Variable** | **Geographic Scale** | **Difference in means (95% CI) Pre % Change - Post % Change** | **t Statistic** | **df** | **Our score** |
| USA-NPN | Records By Site | USA | 58.63368  (16.08298, 101.18438) | 2.7077 | 474 | High |
| USA-NPN | Data Collection Dates By Site | USA | 26.65666 (8.498893, 44.814436) | 2.8847 | 475 | High |
| eButterfly | Observations By State | USA | 10.14071 (-187.2219, 207.5033) | 0.10543 | 27 | Low |
| eButterfly | Observers By State | USA | 0.22296 (-50.006, 50.452) | 0.00911 | 27 | Low |
| iNaturalist | Observations By State | USA | 21.5718 (2.4764, Inf) | 1.8932 | 50 | High |
| iNaturalist | Observers By State | USA | 62.00041 (45.5904, Inf) | 6.3319 | 50 | High |
| eButterfly | Observations By Province/State | North America | -4.568103 (-157.1609, 148.0246) | -0.06077 | 35 | Low |
| eButterfly | Observers By Province/State | North America | -12.34934 (-53.0485, 28.3498) | -0.61600 | 35 | Low |
| iNaturalist | Observations By Province/State | North America | 62.56228 (33.535, Inf) | 3.5800 | 95 | High |
| iNaturalist | Observers By Province/State | North America | 57.8127 (44.01, Inf) | 6.9573 | 95 | High |
| iNaturalist | Observations By Nation | Global | 342.4665 (33.535, Inf) | 3.8008 | 194 | High |
| iNaturalist | Observers By Nation | Global | 94.56345 (66.6882, Inf) | 5.6068 | 194 | High |

**Notes:** df were lower than expected (not all provinces and states) as state/province/nations were removed from analysis if they did not have data in all three years (2018-2020)

**Summary:** For eButterfly covid19 did not seem to significantly affect either the % change in observations or observers while we did see a significant decline in both observations and observers for US-NPN and iNaturalist across multiple geographic scales. Both observations and observers growth declined substantially in Mar, Apr, and May of 2020 in the USA (US-NPN & iNaturalist), North America (iNaturalist), and Globally (iNaturalist).