Supplemental file 1

Resources identified from our literature review that report demographic surveys of citizen science participants and the demographic characteristics the surveys included (Table S.1).

Table S.1

Reference	Demographics Asked
Bedessem, B., Dozières, A., Prévot, A.-C. and Julliard, R. (2023). 'Science knowledge and trust in science in biodiversity citizen science projects', JCOM, 22(01), A05. https://doi.org/10.22323/2.22010205	Age Gender Education
Blake, C., Rhanor, A. and Pajic, C. (2020). 'The Demographics of Citizen Science Participation and Its Implications for Data Quality and Environmental Justice', Citizen Science: Theory and Practice, 5(1), p. 21. Available at: https://doi.org/10.5334/cstp.320.	Education level Household income Race
Bonter, D.N., Martin, V.Y., Greig, E.I. and Phillips, T.B. 'Participant retention in a continental-scale citizen science project increases with the diversity of species detected', BioScience, Volume 73, Issue 6, June 2023, Pages 433–440, https://doi.org/10.1093/biosci/biad041	Age Gender
Braz Sousa, L. et al. (2024). 'Learning outcomes for participants in citizen science mosquito surveillance', Journal of Medical Entomology, 61(6), pp. 1399–1409. Available at: https://doi.org/10.1093/jme/tjae117.	Age Gender Education Occupation
Bruckermann, T. et al. (2021). 'To know about science is to love it? Unraveling cause–effect relationships between knowledge and attitudes toward science in citizen science on urban wildlife ecology', Journal of Research in Science Teaching, 58(8), pp. 1179–1202. Available at: https://doi.org/10.1002/tea.21697.	Age Gender Education
Crall, A. W., Jordan, R., Holfelder, K., Newman, G. J., Graham, J., and Waller, D. M. (2012). 'The impacts of an invasive species citizen science training program on participant attitudes, behavior, and science literacy', Public Understanding of Science, 22(6), 745-764. https://doi-org.libproxy.york.ac.uk/10.1177/0963662511434894	Age Gender Education Occupation

Reference	Demographics Asked
Dekramanjian, B., Bartumeus, F., Kampen, H. et al. 'Demographic and motivational differences between participants in analog and digital citizen science projects for monitoring mosquitoes', Sci Rep 13, 12384 (2023). https://doi.org/10.1038/s41598-023-38656-y	Age Gender Education Employment Income Living environment
Depper, A. (2019) 'Evaluating Online Citizen Science', University of Oxford. Available at: https://researchsupport.admin.ox.ac.uk/files/perevaluationrecipe1onlinecitizensciencepdf#:~:text=For%20example%2C%20share%20the%20link,and%20consent%20to%20use%20them	Age Gender Education level Employment status Occupation description Background in science Country of residence
Druschke, C.G. and Seltzer, C.E. (2012). 'Failures of Engagement: Lessons Learned from a Citizen Science Pilot Study', Applied Environmental Education & Communication, 11:3-4, 178-188	Age Gender Education level Education field
Fogg-Rogers, L. et al. (2024) 'Citizen-led emissions reduction: Enhancing enjoyment and understanding for diverse citizen engagement with air pollution and climate change decision making', Environmental Science & Policy, 154, p. 103692. Available at: https://doi.org/10.1016/j.envsci.2024.103692.	Age Gender Education level
Hano, M.C. et al. (2020) 'Knowing Your Audience: A Typology of Smoke Sense Participants to Inform Wildfire Smoke Health Risk Communication', Frontiers in Public Health, 8, p. 143. Available at: https://doi.org/10.3389/fpubh.2020.00143.	Age Gender Education Race/ethnicity Health conditions

Reference	Demographics Asked
Harwell, T. A., Low, R., Mattheis, A., Riedinger, K., & Fischer, H. (2022). 'Is citizen science queering science? An exploration of the personal dimensions of engaging LGBTQ+ citizen science volunteers', International Journal of Science Education, Part B, 13(2), 116–130. https://doi-org.libproxy.york.ac.uk/10.1080/21548455.2022.2137706	Age Gender Location Race/ethnicity Sexuality
Hesley, D. et al. (2017) 'Citizen science benefits coral reef restoration activities', Journal for Nature Conservation, 40, pp. 94–99. Available at: https://doi.org/10.1016/j.jnc.2017.09.001.	Age Gender Education level and field
Heym, E.C. et al. (2017) 'The Nuisance Mosquito Anopheles plumbeus (Stephens, 1828) in Germany—A Questionnaire Survey May Help Support Surveillance and Control', Frontiers in Public Health, 5. Available at: https://doi.org/10.3389/fpubh.2017.00278.	Age Education Employment State they lived in (Germany)
Hosie, A. et al. (2024) 'Citizen science to improve patient and public involvement in GUideline Implementation in oral health and DEntistry (the GUIDE platform)', Health Expectations, 27(1), p. e13921. Available at: https://doi.org/10.1111/hex.13921.	Age Gender Education
Jeong, E., Jackson, C., Dowthwaite, L., Ahmad, T. and Trouille, L. (2023). 'Assessing the Value Orientations of Contributors to Virtual Citizen Science Projects'. In Proceedings of the 11th International Conference on Communities and Technologies (C&T '23). Association for Computing Machinery, New York, NY, USA, 191–202. https://doi-org.libproxy.york.ac.uk/10.1145/3593743.3593782	Age Gender Education Ethnicity Income level
Leonard, A., Wheeler, S. and McCulloch, M. (2023) 'Does Citizen Science Bring "Power to the People"? Evaluating a Remote Mapping Project to Identify Best Practices for Positive Impact on Volunteers', Citizen Science: Theory and Practice, 8(1), p. 4. Available at: https://doi.org/10.5334/cstp.534.	Age Gender Education level Employment status Education/employment field

Reference	Demographics Asked
	Country of residence
Lucrezi, S., Milanese, M., Palma, M., Cerrano, C. (2018) 'Stirring the strategic direction of scuba diving marine Citizen Science: A survey of active and potential participants', PLoS ONE 13(8): e0202484. https://doi.org/10.1371/journal.pone.0202484	Age Gender Education level Occupation Nationality
MacPhail, V.J., Gibson, S.D., Colla, S.R. (2020). 'Community science participants gain environmental awareness and contribute high quality data but improvements are needed: insights from Bumble Bee Watch', PeerJ 8:e9141 https://doi.org/10.7717/peerj.9141	Age Education State (US&Canada)
Moczek, N., Hecker, S., & Voigt-Heucke, S. L. (2021). 'The Known Unknowns: What Citizen Science Projects in Germany Know about Their Volunteers—And What They Don't Know', Sustainability, 13(20), 11553. https://doi.org/10.3390/su132011553	Gender Education
Moczek, N., Nuss, M., & Köhler, J. K. (2021). 'Volunteering in the Citizen Science Project "Insects of Saxony"—The Larger the Island of Knowledge, the Longer the Bank of Questions', Insects, 12(3), 262. https://doi.org/10.3390/insects12030262	Age Gender Education Employment Status Size of place of residence
National Academies of Sciences, Engineering, and Medicine (NASEM). (2018). 'Appendix A: Demographic Analyses of Citizen Science.' In: Learning Through Citizen Science: Enhancing Opportunities by Design. Washington, DC: The National Academies Press. doi: 10.17226/25183.	Age Gender Education level Retiree participation Income Race/ethnicity
O'Grady, M. and Mangina, E. (2024) 'A dataset of citizen science practitioners' experiences and practices', Data in Brief, 56, p. 110779. Available at: https://doi.org/10.1016/j.dib.2024.110779.	Age Gender Country based in

Reference	Demographics Asked
Ostermann-Miyashita, E.-F. et al. (2022) 'Knowledge of returning wildlife species and willingness to participate in citizen science projects among wildlife park visitors in Germany', People and Nature, 4(5), pp. 1201–1215. Available at: https://doi.org/10.1002/pan3.10379.	Age Gender State of residence (Germany) Degree of urbanisation (urban/rural)
Pateman, R, Dyke, A and West, S. (2021). 'The Diversity of Participants in Environmental Citizen Science', Citizen Science: Theory and Practice, 6(1): 9, pp. 1–16. DOI: https://doi.org/10.5334/cstp.369	Age Gender Employment Status Social grade Ethnicity Area (urban/rural)
Peter, M. et al. (2021) 'Biodiversity citizen science: Outcomes for the participating citizens', People and Nature, 3(2), pp. 294–311. Available at: https://doi.org/10.1002/pan3.10193.	Age Gender Education Profession Is profession in CS topic field Area (rural/urban)
Perry, T., Stenhouse, A., Wilson, I., Perfetto, I., McKelvey, M.W., Coulson, M., Ankeny, R.A., Rismiller, P.D., & Grützner, F. (2022). 'EchidnaCSI: Engaging the public in research and conservation of the short-beaked echidna', Proc. Natl. Acad. Sci. U.S.A. 119 (5) e2108826119, https://doi-org.libproxy.york.ac.uk/10.1073/pnas.2108826119	Age Education Employment Status Ethnicity
Sardo, A. M., Laggan, S., Fogg-Rogers, L., Franchois, E., Maccani, G., Vanherle, K. and Hayes, E. (2024). 'Measuring the impacts of participatory citizen science: lessons from the WeCount sustainable mobility project', JCOM 23(05), N01. https://doi.org/10.22323/2.23050801	Age Gender Education Income

Reference	Demographics Asked
Strasser, B.J., Tancoigne, E., Baudry, J., Piguet, S., Spiers, H., Luis-Fernandez Marquez, J., et al. (2023) 'Quantifying online citizen science: Dynamics and demographics of public participation in science', PLoS ONE 18(11): e0293289. https://doi.org/10.1371/journal.pone.0293289	Age Gender Education Occupation
Thompson, M.M. et al. (2023) 'Citizen science participant motivations and behaviour: Implications for biodiversity data coverage', Biological Conservation, 282, p. 110079. Available at: https://doi.org/10.1016/j.biocon.2023.110079.	Age Gender
Tiago, P., Evaristo, I. and Pinto, B. (2024) 'The role of BioBlitzes in citizen science: insights from participants and experts', Frontiers in Environmental Science, 12. Available at: https://doi.org/10.3389/fenvs.2024.1347428.	Age Gender Education level and field Place of residence
Trinnie, F.I. and Ryan, K.L. (2024) 'Differences in fisher demographics and fishing behaviour from concurrent phone-recall and smartphone app surveys of recreational angling in south-western Australia', Fisheries Management and Ecology, p. e12736. Available at: https://doi.org/10.1111/fme.12736.	Age Gender Area of residence (metropolitan/regional)
Unterfrauner, E., Fabian, C.M., Hemming, G. and Garcia, B. 'What's in it for citizen scientists? An Analysis of Participant Inclusivity in Citizen Science Projects in Advanced Physics Research' [version 3; peer review: 2 approved, 2 approved with reservations]. Open Res Europe 2025, 4:124 (https://doi.org/10.12688/openreseurope.17436.3)	Age Gender Educational background
Waugh, J. K., Lindsey, J. K., Stewart, M. Z., Winter, J. C., & Parrish, J. K. (2023). 'Demographics of Public Participation in Science: A Meta-Analytic Approach', Citizen Science: Theory and Practice, 8(1), 61. https://doi.org/10.5334/cstp.610	Age Gender Race/Ethnicity Education Retiree participation

A targeted search of citizen science books (Table S.2) and websites (Table S.3) was conducted to establish if any recommendations currently exist for designing demographic surveys in citizen science projects. Website search functions were used to search for the terms ‘survey’; ‘diversity’; or ‘inclusion’; and any ‘resources’ pages directly viewed.

Searches found discussion of diversity and inclusion in webinars and literature, but none directly relating to inclusive survey design. Guidelines found related to ethics, data quality, and measuring outcomes such as environmental action and learning but no recommendations on participant demographic surveys. Examples of demographic surveys were added to Table S.1 (Pateman, R, Dyke, A and West, S. (2021); NASEM (2018) Appendix A).

Table S.2

Citizen Science Books Consulted	
Citation	**Relevant material found**
Hecker, S., Haklay, M., Bowser, A., Makuch, Z., Vogel, J., & Bonn, A. (Eds.). (2018) *Citizen Science: Innovation in Open Science, Society and Policy*. UCL Press. http://www.jstor.org/stable/j.ctv550cf2	No examples of demographic surveys. No survey design guidance.
NASEM (National Academies of Sciences, Engineering, and Medicine). (2018) *Learning Through Citizen Science: Enhancing Opportunities by Design*. Dibner K.A. and R. Pandya, R. (eds.). Washington (DC): National Academies Press (US). https://pubmed.ncbi.nlm.nih.gov/30640416/	Appendix A: Demographic Analyses of Citizen Science No survey design guidance.
Vohland, K., Land-Zandstra, A., Ceccaroni, L., Lemmens, R., Perelló, J., Ponti, M., Samson, R. and Wagenknecht, K. (Eds.). (2021) *The Science of Citizen Science*. Springer Nature. DOI: https://doi.org/10.1007/978-3-030-58278-4	Discussion of gender inclusion: Paleco, C., García Peter, S., Salas Seoane, N., Kaufmann, J., Argyri, P. (2021). Inclusiveness and Diversity in Citizen Science. https://doi.org/10.1007/978-3-030-58278-4_14 No examples of demographic surveys. No survey design guidance.

Schürz, S., Schaefer, T. and Kieslinger, B. (2025) *The impact of citizen science: 12 stories from across Europe*. Zenodo. DOI: https://doi.org/10.5281/zenodo.14899094.	Discussion of strategies for inclusion. No examples of demographic surveys. No survey design guidance.

Table S.3

Citizen Science Websites Consulted		
Website owner	**URL**	**Relevant material found**
European Citizen Science Association (ECSA)	https://www.ecsa.ngo/	Webinars on inclusion in CS (https://citizenscience.eu/resource/218 ; https://citizenscience.eu/resource/303) Literature on diversity and inclusion (Paleco, C., García Peter, S., Salas Seoane, N., Kaufmann, J., Argyri, P. (2021). Inclusiveness and Diversity in Citizen Science. In: Vohland, K., *et al.* The Science of Citizen Science. Springer, Cham. https://doi.org/10.1007/978-3-030-58278-4_14 ; Pateman, R, Dyke, A and West, S. (2021). 'The Diversity of Participants in Environmental Citizen Science', Citizen Science: Theory and Practice, 6(1): 9, pp. 1–16. DOI: https://doi.org/10.5334/cstp.369) No survey design guidance found in search.
Association for Advancing Participatory Sciences (AAPS)	https://participatorysciences.org/	Survey instruments to measure learning outcomes

(formerly the US Citizen Science Association)		(https://participatoryscience.org/resources/survey-instruments-to-measure-learning-outcomes/) Data ethics toolkit (https://participatoryscience.org/wp-content/uploads/2023/02/Data-Ethics-Toolkit-v3.pdf) Research and evaluation resources (https://participatoryscience.org/resources/research-evaluation/#Designing%20for%20Inclusivity) No survey design guidance found in search.
Australian Citizen Science Association	https://citizenscience.org.au/	Refers to ECSA resources. No survey design guidance found in search.
Citizen Science Asia	https://citizenscience.asia/	No public resources page. No survey design guidance found in search.
CitSci Africa	https://citsciafrica.it.com/	No public resources page. No survey design guidance found in search.
RICAP (Rede Ibero-Americana de Ciência Participativa) *Ibero-American Participatory Science Network*	https://cienciaparticipativa.net/	No public resources page. Unable to search.
Citizen Science Ireland	http://citizen-science.ie/	No public resources page. No survey design guidance found in search.
CORDIS *a repository of outputs from EU Research & Development projects, a major funder of citizen science*	https://cordis.europa.eu/	Impact measurement (https://cordis.europa.eu/article/id/435880-measuring-the-impact-of-citizen-science ; https://jcom.sissa.it/article/pubid/JCOM_2006_2021

		_A02/) No survey design guidance found in search.