

A code of conduct for (biodiversity and environmental) scientists

Preamble

Science advances through critical thinking and testing ideas and practices, and discoveries may confirm and challenge existing paradigms. Science benefits from people's diverse perspectives, with knowledge gained from oral and written history, philosophy, observations, experiments, data analysis, and practical skills. The diversity of beliefs, practices, and thinking can create tensions, which can be constructive but may upset people and the status quo. As scientists, we need to be sensitive and respectful of these tensions and their consequences, avoid hegemony and strive to do the best possible science that will benefit people and nature in present and future generations. Here, we consider “scientists” to cover all researchers and practitioners, including consultants and others in the private sector who are engaged in the discovery, government policy advisors, and social and natural scientists spanning engineering and biomedicine to humanities and the arts. Here we reflect on the behaviours and practices that enable a science that benefits society.

Effective science practices and good citizenship require us to uphold high ethical and moral standards (Institute of Medicine 2009; Barbier et al., 2018). Most existing scientific codes of ethics and conduct tend to focus on employer-employee relationships (e.g., NOAA 2021), legal obligations (e.g., in conducting experiments on animals), publication ethics (e.g., Albert and Wager 2010, Anon. 2019a), data ethics and best practices (e.g., Costello and Wieczorek 2014, Wilkinson et al. 2016, Moher et al. 2020, OECD 2021). Respect for the diversity of people in the scientific community and society (TRUST 2018, Popp et al. 2020, e.g., CARE principles regarding Indigenous Peoples) and equity are also being highlighted as guiding principles (e.g., Giakoumi et al. 2021). Online resources for teaching good ethical practice have also emerged (e.g., Anon. 2021a, b). Many national academies, scientific societies and research programmes have codes of ethics for their members reflecting their activities such as guidelines for institutional practice regarding research ethics, promotion and hiring (e.g., Anon. 2007, 2008, 2019b, 2020a, b; ALLEA 2017). Over 2,500 codes and guidelines from over 1500 organizations around the world, including current and historical codes dating to 1887 have been archived in the Ethics Codes Collection (Anon. 2021a). These codes have been developed through committees established by national academies and other organisations. However, most existing codes of scientific conduct have gaps. For example, most do not explicitly guide how field studies should be conducted (Minteer and Collins 2005a, b; Costello et al. 2016).

Although the present code originated to guide individual scientists practising in the fields of biodiversity and environmental sciences it is more widely applicable. These guidelines were developed through a review of existing literature and by consulting with a wide range of individual scientists representing the diversity of our community around the world, to provide perspectives across ages, gender, languages, cultures, and ethnicities. We do not suggest that we have the special moral authority to dictate such a code, nor that this code is definitive. Rather, its value will be judged by who adopts it, and whether and how it affects the practice of science and the well-being of people and nature. We hope this code advances changes in behaviour and thought-provoking discussion that move us toward those goals. We encourage organisations and institutions to adopt any parts of this code for their purposes and to help review and update it as appropriate.

The guidelines below summarize values and principles regarding how we should work with others, engage with society, and how our work and methods impact life and nature. We encourage all to delve into more detailed guidelines developed by others. We start with three overarching principles, focusing on conduct about people, nature, and scientific practice. Further details are divided into personal behaviours, practices, and publication strategies.

Overarching Principles: We...

1. *respect everyone* and accept diversity of age, gender, sexuality, race, origin, religion, ancestry and culture, social and economic status, and physical and mental ability. This includes promoting and facilitating equity in all transactions.
2. *respect nature* by practising and promoting sustainable use of natural resources and minimising disturbance of living organisms and natural environments.
3. *conduct our science* with honesty and transparency of evidence, data, knowledge, know-how and/or ideas (Montreal Statement on Research Integrity 2013, Resnik and Shamoo, 2011)).

Behaviours: We...

4. *take time to be mindful*, considerate, and supportive of others and their circumstances.
5. *respect confidentiality, and cultural and indigenous sensitivities*, and do not impose ideologies (e.g., political, religious) on others.
6. *refrain and actively oppose discrimination*, harassment, bullying, and misuse of power.
7. *respect the spirit and letter of laws*, regulations, agreements, and institutional requirements where these are appropriately designed for the benefit of a broader society, and otherwise work with these institutions for change.
8. *practice integrity*, honesty, impartiality, objectivity, and intellectual rigour in our work.

- 61 9. *are accountable for our research*, including mistakes and oversights in professional practice, publications, peer
62 review, data collection and interpretation.
63 10. *oppose the spread of misinformation* and misleading presentation of evidence, such as selective reporting to
64 conceal evidence of governmental, industrial, scientific, social and/or environmental issues that society should be
65 aware of.
66 11. *declare conflicts of interest*, both actual and potential, that may be perceived to influence our research and its
67 interpretation.
68 12. *support the profession and colleagues*, such as by contributing as an editor and peer reviewer, organising
69 meetings, mentoring, educating, and sponsoring as opportunities arise, and by supporting those disadvantaged by
70 breaches of these guidelines.
71 13. *acknowledge our backgrounds* and limitations of expertise in all discussions and applications.
72 14. *foster the ideals of this Code of Conduct* in others, including training and mentoring staff and students.
73

74 **Practices: We...**

- 75 15. *consider the consequences* our behaviour and work have on people and nature, including wildlife, climate change,
76 and the environment, and minimize detrimental impacts.
77 16. *minimise health and safety risks* to ourselves, other people, and nature.
78 17. *prioritize research* methods and practices that have a *low impact* on the well-being of people and nature, in the
79 laboratory and natural environment,
80 18. *and obtain permission* from landowners, local communities, Indigenous People, and any other relevant authorities
81 in any fieldwork.
82 19. *make it clear that people are free to refuse* to participate in particular research. This includes explaining health
83 and safety risks, and the effects the research may have on participants, other people, and the environment.
84 20. *avoid spreading species*, including microbial pathogens, beyond their natural ranges.
85 21. *deposit physical samples*, including specimens, in herbaria, museums, or other appropriate national archives with
86 rigorous metadata and all appropriate permits so they are maximally accessible to other users.
87

88 **Publication: We...**

- 89 22. *publish research findings and supporting primary data* in an accurate, timely manner to contribute to scientific
90 knowledge, and enable the work's transparency, reproducibility, and replicability.
91 23. *acknowledge people* who have helped our research, including funding sources, and cite prior work and ideas
92 which our work incorporates.
93 24. *respect the intellectual and material property of others*. Where we use data from third parties, we seek their
94 permission to use and release data as appropriate.
95 25. *respect the sensitivity of data* that may enable the identification of individual people, or aid criminal or unethical
96 behaviour, such as the collection of threatened species, the spread of pests, or infringing other's patents or
97 copyrights.
98 26. *support publication* of ethical scientific research, as an editor or reviewer, regardless of whether it conflicts with
99 our beliefs or interests, or those of our employers or group consensus.
100 27. *never fabricate or falsify research* findings, plagiarise the work of others, or condone such misconduct by others.
101 28. *follow scholarly publishing guidelines* for authorship and acknowledgements in scientific research papers (e.g.,
102 the "Vancouver Guidelines" Anon. 2019a; Parker and Berman, 1998; CASRAI, 2021).
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