



Editorial

Who are our reviewers and how do they review? The profile and work of *Biological Conservation* reviewers



Richard B. Primack^a, Martine Maron^b, Ahimsa Campos-Arceiz^{c,d,*}

^aBiology Department, Boston University, 5 Cummington Mall, Boston, MA 02215, USA

^bThe University of Queensland, School of Geography, Planning and Environmental Management and Centre for Biodiversity Conservation Science, Brisbane, Queensland, 4072, Australia

^cSchool of Environmental and Geographical Sciences, University of Nottingham Malaysia Campus, Jalan Broga, Semenyih 43500, Selangor, Malaysia.

^dMindset Interdisciplinary Centre for Environmental Studies, University of Nottingham Malaysia Campus, Jalan Broga, Semenyih 43500, Selangor, Malaysia.

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ABSTRACT

To improve the present system of peer review of scientific papers, editors and publishers need to know: Who are the reviewers? How frequently do they decline or accept and complete their reviews? And what factors affect their willingness to accept reviews? We analyzed the peer review process for 1590 manuscripts submitted to the journal *Biological Conservation* during the period 2014–2015. Overall, 11,840 review invitations were sent to 6555 different reviewers. 60% of invited reviewers were from four large English-speaking countries—United States, United Kingdom, Australia, and Canada—while only 1% or fewer of invited reviewers were from certain populous countries such as India and China. Considering only the first round of reviews, we found that, on average, editors invited 6.7 reviewers per manuscript, and reviewers accepted 37% of invitations. Reviewer gender, seniority, and academic productivity had no effect on acceptance rate. Reviewers from China accepted a higher proportion of invitations than did reviewers from any other country. Individuals who had accepted an invitation were more likely to accept a second invitation for a different manuscript, and reviewers who were fast with one review tended to be fast with the review of the next manuscript. Over 90% of reviewers completed their reviews, and most reviews were submitted on time. Editors should consider expanding the diversity of reviewers they invite, and particularly invite more scientists from under-represented countries.

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1. Introduction

The modern system of academic peer review relies on the willingness of reviewers to provide independent and anonymous reviews of manuscripts submitted for publication (Souder, 2011). Reviewers are not paid for reading and providing critical reviews of these papers. Instead, reviewers review manuscripts in part as a reciprocally altruistic service to their profession and also to gain access to the most current research in their field (Tite and Schroter, 2007; Kearney et al., 2008).

Despite the heavy dependence of scientific progress on peer-review, the profile and behavior of reviewers have not been very well studied. Journal editors have only limited understanding of the behavior, characteristics, motivations, and biases involved in the process of reviewers accepting and providing reviews (Grod et al., 2008). For example, it has been suggested that women and younger researchers are more likely to accept invitations to review manuscripts (Matías-Guiu et al., 2010),

that North Americans are faster at reviewing them, and that men are more likely than women to recommend rejecting papers (Grod et al., 2008). Conversely, recent research on the review process for the journal *Functional Ecology* found few influences of reviewer gender, seniority or geographical location on peer-review outcomes, but did find differences in responses to review invitations (male reviewers were less likely to respond and more likely to decline invitations from female editors; Fox et al., 2016a, 2016b, 2016c).

Biological Conservation is a leading international journal of conservation science. It receives over 1700 manuscripts per year, of which about 900 are immediately rejected without review and 800 sent out for review, from which about 400 papers are eventually published. To review this many submissions editors must rely on a large cohort of skilled reviewers, yet the journal's editors and publisher have never explored the characteristics of the people involved in the review process. In this editorial, we ask: who are our reviewers and what do they do? Specifically, we aim to answer the following questions: (1) What is the profile of the reviewers in terms of geographic location, gender, academic seniority, and productivity? (2) How many review invitations are accepted, and does acceptance rate vary with geography, gender, seniority, or past behavior? (3) What is the rate and speed of review completion? We use

* Corresponding author.

E-mail addresses: primack@bu.edu (R.B. Primack), ahimsa@camposarceiz.com (A. Campos-Arceiz).

our results to consider adjustments to the editorial process and to discuss reviewer fatigue. While this is a study of reviewers from just one journal, we believe that our results support a collective increasing awareness of reviewer behavior that can support continual improvement of the peer-review process.

2. Methods and results

2.1. The dataset

To answer our research questions, we used data from *Biological Conservation's* review process for a two-year period (2014–2015), during which we sent out 1590 different manuscripts to review. These reviews involved a total of 11,840 review invitations to 6555 different potential reviewers. The original dataset included information on the reviewers' identity (name and a unique identification code) and affiliation (country and in some cases institution), and the dates when reviewers received the invitations, responded, and completed the reviews. Because we were interested mainly in the first round of review of the manuscripts, we randomly selected data for 600 manuscripts and manually separated the first round of review from subsequent rounds. We were also interested in the reviewers' profiles; therefore, we randomly selected 600 reviewers and manually identified their gender, academic seniority (measured as the number of years since the publication of the reviewers' first academic paper), and academic productivity (total number of papers published divided by seniority). Information on academic seniority and productivity was based on information publicly available in ResearchGate (www.researchgate.net). We omitted certain manuscripts or reviewers from particular analyses when we lacked adequate information—e.g., ability to identify the first review, reviewer gender, year of first publication, etc.—necessary to include them. See Appendix for more details about the dataset. Below we indicate whether the analyses were conducted with the full dataset or with different subsets thereof.

2.2. Who are our reviewers?

2.2.1. Reviewers tend to live in English-speaking and wealthy countries.

The reviewers in our full two-year sample ($N = 6555$) were affiliated with 106 countries (Fig. 1) and over 2000 different institutions. By

country, 60% of the reviewers resided in just four large and wealthy countries, all of them with English as the main language (Fig. 1): United States (34% of the reviewers), Australia (11%), United Kingdom (11%), and Canada (5%). The most common non-English-speaking countries represented were Brazil (5% of reviewers), Spain (3%), Germany (3%), and France (3%). Only 1% or fewer of the reviewers came from countries such as India, China, Indonesia, and Nigeria, despite their great biological diversity, large human populations, and large numbers of universities.

2.2.2. Reviewers tend to be mid-career men.

The gender of our reviewers was predominantly men with 2.2 men for each woman. The reviewers in our 600-reviewer sub-sample published their first papers on average 16.9 ± 10 SD (median = 15, range = 0–52; $N = 394$) years ago and they had a mean career publication rate of 3.9 ± 2.9 (median = 3, range 0–20; $N = 391$) papers per year. Male reviewers were both more senior (19 vs 12 years since the first published paper, $t = -7.2$, $df = 309$, $p < 0.001$; Fig. A1) and had higher annual publication rates (4.4 vs 2.9 papers per year, $t = -5.9$, $df = 378$, $p < 0.001$) than female reviewers.

2.3. What are our reviewers doing?

2.3.1. Reviewers accept 37% of the invitations that are sent out.

To analyze patterns of acceptance to review manuscripts we used data from the first round of reviews ($N = 575$ manuscripts). On average, *Biological Conservation* editors sent 6.7 ± 3.8 (mode = 4, range = 1–24; Fig. A2) review invitations per manuscript. For a small fraction of papers (12.8%) editors invited >10 reviewers before they stopped inviting more reviewers. In one noteworthy case, an editor invited 24 people to review one paper—thankfully that is the exception rather than the norm. Of all the invitations sent out, reviewers accepted 37% and declined or ignored 63%. Presumably some of the ignored invitations were sent to inactive or undeliverable email addresses.

2.3.2. Reviewers from China were the most likely to accept invitations, whereas reviewers from northern Europe were particularly likely to decline invitations.

Analyzing geographical patterns using data from the first round of reviews ($N = 3886$ review invitations) we found significant differences

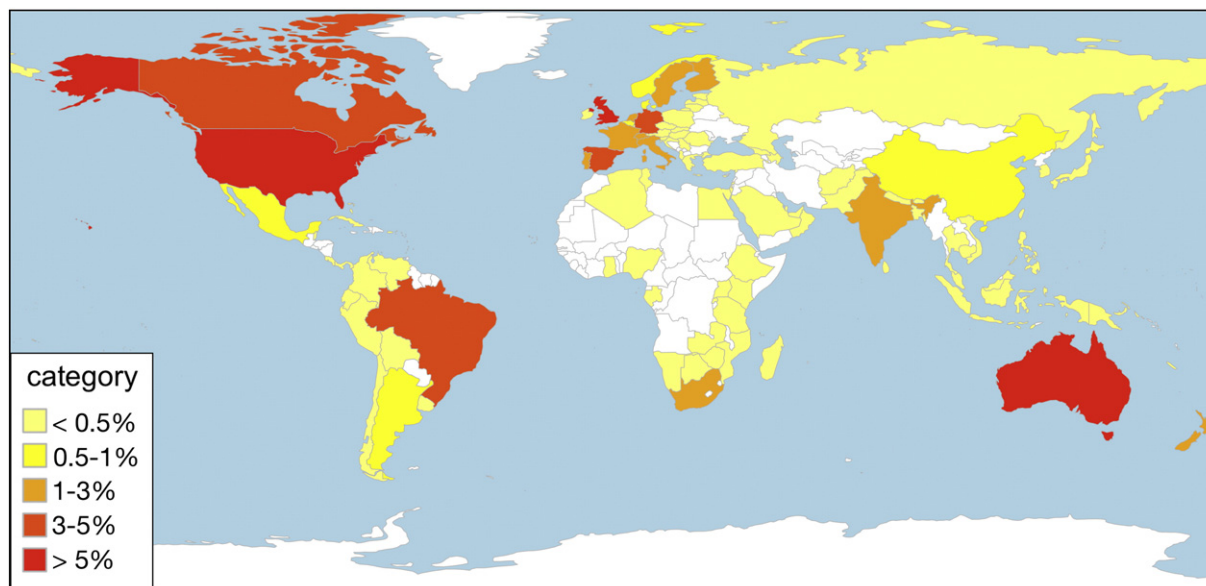


Fig. 1. Distribution of *Biological Conservation* reviewers by country of affiliation in 2014 and 2015.

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