



Editorial

Are conservation biologists working too hard? ☆

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ABSTRACT

The quintessential scientist is exceedingly hardworking and antisocial, and one who would spend countless evenings and weekends buried under her/his microscopes and manuscripts. In an attempt to bust this popular myth, we analyzed the work habits of conservation biologists using data from *Biological Conservation's* online manuscript submission system, which includes more than 10,000 manuscript submissions and almost 15,000 reviews from between 2004 and 2012. We found that 11% of new manuscripts and 12% of manuscript reviews were submitted on weekends. Weekend submission rates increased by 5% and 6% for new manuscripts and reviews respectively per year during the study period. Chinese and Indian biologists worked the most on weekends compared to their colleagues elsewhere, submitting 19% of their manuscripts on Saturdays and Sundays. At the other end of the spectrum, Belgians and Norwegians submitted only 4% of manuscripts on weekends. Czech and Polish biologists were the most assiduous weekend reviewers, submitting 27% and 25% of reviews on weekends, respectively. Irish and Belgian reviewers worked the least on weekends, submitting only 6% of reviews during that time. Sixteen percent of new manuscripts were submitted on weekdays after regular office hours – between 19:00 pm and 07:00 am – with the highest rate of nighttime submissions by Japanese (30%), Mexican (26%) and Brazilian (22%) scientists. Finnish, South African and Swiss researchers, however, submitted only 9%, 10%, and 10% of new manuscripts after regular working hours. In general, our results suggest that conservation biologists work extensively on weekends and at night, that the trend for working on weekends is increasing over time, and that these patterns have strong geographical structure. These habits could have negative impacts on the quality of the work as well as on the life–work balance of conservation scientists. Universities and other scientific organizations should allocate more time during regular work hours for scientists to complete their research duties, including the submission and review of manuscripts.

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1. Introduction

Scientists have busy schedules. Their workloads are steadily increasing with the institutional demands of administration, teaching, mentoring, grant writing and publishing (Mamiseishvili and Rosser, 2010). By the late 1990s, university professors in the United States averaged 53–55 working hours per week (Jacobs, 2004), requiring work to be completed after regular office hours and during the weekends (Cabanac and Hartley, 2013; Ladle et al., 2007; Wang et al., 2012). Although the majority of US scientists at universities and other research institutions enjoy their jobs (Jacobs and Winslow, 2004), many report being dissatisfied with their workloads, particularly in terms of teaching and administration (Mamiseishvili and Rosser, 2010; Fox et al., 2011). Scientific journals are also impacted

by busy researchers who are becoming increasingly unwilling to review manuscripts (Baveye and Trevors, 2011).

Scientists from different countries may have developed varied work habits to cope with these increasing workloads. Citizens of one country might be perceived to be more diligent than those of another, and this perception can give rise to national stereotypes. These perceptions, however, are largely anecdotal and subjective; as far as we know, there have been few studies comparing the work habits of scientists from different countries (but see Wang et al., 2012; Ladle et al., 2012).

The purpose of this study is to determine whether conservation biologists (authors and reviewers) have a tendency to work on weekends and at night (overtime), whether this tendency differs among researchers from different countries, and whether there is any trend of biologists clocking more overtime now than they did in the past.

2. Methods

To investigate the work habits of conservation biologists, we obtained data on: (i) the day and time of submission of 10,512

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manuscripts; and (ii) the day of completion of 14,918 reviews, all submitted to the journal *Biological Conservation* from 2004 to 2012. Unfortunately the time of completion of reviews was not available and thus could not be included in this study. The dates and times of submission were normalized to the location from where the author or reviewer made the submission. This database also includes the country of the host institution and, in some cases, the academic standing of the authors ($N = 3130$) and reviewers ($N = 3347$).

We used chi-squared tests of association and generalized linear models (GLM) to determine whether authors and reviewers were more or less likely to submit papers and reviews over a weekend than during the traditional workweek. The days that compose the weekend and its duration vary among countries. Here we considered weekend as the part of the working week legally devoted to rest in each country. In most countries, weekend refers to Saturday and Sunday but exceptions to this model include countries such as Saudi Arabia (Thursday and Friday), Egypt (Friday and Saturday), Brunei (Friday and Sunday), and Nepal (only Saturday). We also accounted for countries that have changed their legal working week during the study period (e.g. Hong Kong had a six-day working week until 2006; see the [Supplementary Material For Details](#)).

We performed the same analysis to compare paper submissions between two time periods on weekdays: during regular office hours (07:00 to 19:00 h, or 7:00 am to 7:00 pm) and after regular office hours (19:00 to 07:00 h, or 7:00 pm to 7:00 am; as mentioned earlier, the time of submission of reviews could not be analyzed because we did not have the data). We further analyzed these patterns at the country level for countries with at least 50 manuscript or review submissions. In cases where data were available, we also analyzed submission patterns among authors and reviewers at different career stages or academic ranks: postgraduate student, postdoctoral, assistant professor, associate professor, and full professor.

We describe our statistical methods in detail in the [Supplementary Material](#).

3. Results

3.1. Weekend submission of papers

The rate of manuscript submission on weekends (11%) was much lower than on weekdays (89%; $\chi^2 = 10.81$, $df = 1$, $N = 10,507$,

$P = 0.001$; [Fig. 1a](#)); if authors were submitting papers equally on all days of the week, we would expect 28.6% of submissions (2/7) on weekends (after excluding the five manuscripts from Nepal, the only country with submissions in which the weekend is just one day a week). Authors were in fact submitting less than a third as many papers on an average weekend day as on an average weekday. Many countries, including the United States, the United Kingdom, and Italy had around 9–11% submissions on weekends. Within the study period there was a gradual increase of ca. 5% per year in the rate of manuscripts submitted on weekends ($df = 1$, Δ Deviance = 17.03, $N = 9,667$; $P < 0.001$). There were also differences among countries ($df = 27$, Δ Deviance = 100.47, $N = 9,667$; $P < 0.001$; [Fig. 2a](#)) and an interaction between year and country ($df = 27$, Δ Deviance = 42.02, $N = 9,667$; $P = 0.03$). By nation, the highest rates of submission on weekends were found in China (19%), India (19%), Israel (16%), and Poland (13%); and the lowest rates were found in Belgium (4%), Norway (4%), and Argentina (6%; [Fig. 2a](#)). The interaction between year and country mentioned above is likely due to certain countries in which the rate of weekend submission is high, such as China, increasing over time in their proportion of total submissions. The academic position ($df = 4$, Δ Deviance = 3.81, $N = 3,130$; $P = 0.43$) of the submitting author did not have any effect on the rate of manuscript submissions on weekends.

3.2. Weekend review of papers

Reviews were also less likely to be submitted on weekends (12%) than on weekdays (88%; $\chi^2 = 18.11$, $df = 1$, $N = 14,914$, $P < 0.001$; [Fig. 1b](#)); this again assumes that 28.6% of reviews would be submitted on weekends. Reviews are increasingly likely to be submitted on weekends ($df = 1$, Δ Deviance = 26.41, $N = 13,783$; $P < 0.001$), with about a 6% increase per year in the number of submissions. There are differences among countries in the percent of weekend reviews ($df = 29$, Δ Deviance = 115.60, $N = 13,754$; $P < 0.001$), and there is an interaction between years and countries for the reasons postulated above ($df = 29$, Δ Deviance = 45.15, $N = 13,725$; $P = 0.028$). The highest rates of reviews submitted on weekends were found in the Czech Republic (27%), Poland (25%), Singapore (25%), and China (25%; [Fig. 2b](#)), which are close to what the rate would be if scientists in these countries were working equally on every day of the week. The lowest rates of submission were found in European countries

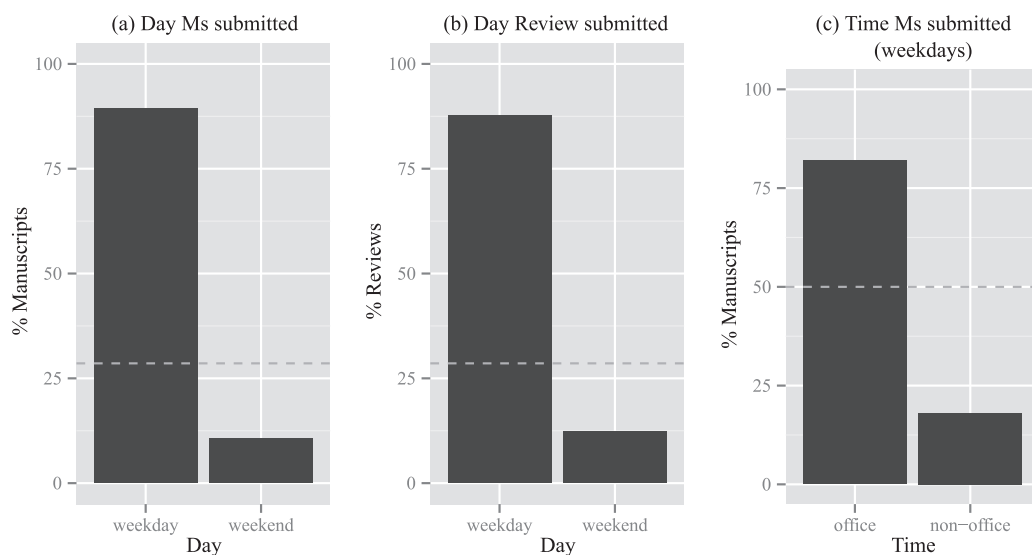


Fig. 1. Work habits of scientists contributing to *Biological Conservation*: distribution of (a) manuscript and (b) review submissions by day of the week; and (c) manuscript submissions by time of the day (including only manuscripts submitted on weekdays). Horizontal dashed lines represent the expected frequency of weekend and nighttime submissions used in chi-squared tests.

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