

On the Need for Inclusivity and Diversity in the Wildland Fire Professions

Karin L. Riley, Forestry Sciences Laboratory, Rocky Mountain Research Station,
U.S. Forest Service, Missoula, Montana;

Toddi Steelman, Nicholas School of the Environment, Duke University, Durham, North Carolina;

Diego R. Pérez Salicrup, Instituto de Investigaciones en Ecosistemas y Sustentabilidad,
Universidad Nacional Autónoma de México, Morelia, Michoacán, México;

and **Sara Brown**, Human Performance and Innovation and Organizational Learning,
Research Development and Application, Rocky Mountain Research Station,
U.S. Forest Service, Bend, Oregon

INTRODUCTION AND BACKGROUND

Inclusivity and diversity are being increasingly recognized as important factors in the production of scientific knowledge, not only for the sake of equal opportunity, but as necessary to the best quality research (e.g. Feliú-Mójer et al 2018; Poster 2018; Smith et al 2018). However, lack of diversity persists in many if not all scientific fields to varying degrees (e.g. Pérez 2018; Poster 2018), and affects various facets of research and education including the underrepresentation of women in leadership at universities (Smaglik 2018; Hamburg et al. 2018), in the peer-review process (Lerback 2017), and in publication in high-impact journals (Shen et al 2018; Woolston 2018).

As such, inclusivity remains a challenge in the field of wildland fire science and management (Smith et al. 2018). Inclusivity and diversity are stymied by a number of factors, but sexual harassment, gender discrimination, and implicit bias are most prevalent. Sexual harassment is conduct of a sexual nature in a workplace or social situation that affects an individual's employment or work performance (EEOC 2016; Hamburg et al. 2018). Sexual harassment can take the form of requests for sexual favors, obscene remarks, or unwelcomed sexual advances. Gender

discrimination occurs when someone is treated unfairly due to their gender (Association for Fire Ecology 2016). It can manifest in unequal pay and/or inequitable opportunity for promotion, benefits, or other professional rewards. Discrimination can be deeply embedded in institutional cultures, so that people may be unaware they are participating in discriminatory practices (Flood and Pease 2009). Implicit bias occurs when individuals unconsciously attribute characteristics to social groups, including women and minorities, based on stereotypes.

The International Association for Wildland Fire (IAWF) and the Association for Fire Ecology (AFE) are two nonprofit organizations working to improve the understanding of wildland fire as an ecological process as well as to increase the safety and effectiveness of the management of wildland fire. As such, AFE and IAWF are working to increase inclusivity in this field. These two organizations were the sponsors of the Large Fires Conference in Missoula, Montana, in May 2014, and the Fire Continuum Conference in Missoula, Montana, in May 2018 (the proceedings of which this paper is included). At the Large Fires Conference, a board member of AFE learned of an assault against a female conference attendee. This incident spurred an AFE effort over the next few years to survey members of

In: Hood, Sharon; Drury, Stacy; Steelman, Toddi; Steffens, Ron, tech. eds. The fire continuum—preparing for the future of wildland fire: Proceedings of the Fire Continuum Conference. 21-24 May 2018, Missoula, MT. Proc. RMRS-P-78. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 358 p.

Papers published in these proceedings were submitted by authors in electronic media. Editing was done for readability and to ensure consistent format and style. Authors are responsible for content and accuracy of their individual papers and the quality of illustrative materials. Opinions expressed may not necessarily reflect the position of the U.S. Department of Agriculture.

the wildland fire professions to gain an understanding of the scope and prevalence of gender discrimination and sexual harassment in this field. As the issue gained a national profile, AFE was invited to submit written testimony on the survey to the Full House Committee on Oversight and Government Reform hearing on Examining Sexual Harassment and Gender Discrimination at the US Department of Agriculture in December 2016 (Kobziar 2016).

In the winter of 2017, AFE and IAWF received a letter signed by over 50 wildland fire professionals ranging from those working in research to land management to the non-profit sector in at least three countries. The letter stated that, “Over the past several AFE and IAWF conferences, a disproportionate number of plenary speaking roles have been awarded to non-minority male scientists. For example, at the recent AFE Orlando conference, only 4 of 19 plenary speakers were women, and minority scientists were strikingly underrepresented. Our profession is growing, and many distinguished colleagues are not being recognized at these conferences...As ecologists, we understand that strength and capacity exists in diversity, not only in ecosystems, but also in societies and associations.”

An examination of the gender ratio in recent AFE and IAWF conferences indicated that this ratio (approximately 1 in 5) was not an aberration. A plenary session on inclusivity was added to the program of the Fire Continuum Conference as a first step in this campaign, with the speakers comprised of Sara Brown, Karin Riley, Diego Pérez Salicrup, and Toddi Steelman (many of the authors of this manuscript). In this manuscript, we discuss the scope and prevalence of the problem, examine some of the effects, and discuss steps IAWF and AFE are taking to monitor and address the problem.

Defining the Problem

The AFE survey found that sexual harassment and gender discrimination are prevalent in the wildland fire vocation (Association for Fire Ecology 2016). Out of the 342 respondents, 24 percent reported experiencing sexual harassment in their workplaces, with 32 percent having witnessed it. One respondent recounted, “The engine captain had me ride alone

with him and spoke in great detail about my breasts.” Gender discrimination was more widely reported, with 44 percent having experienced it in their workplaces while 54 percent had observed it. A respondent reported, “Women have to fight to be included in group discussions, planning strategy and tactics.” Because sexual harassment and gender discrimination are often underreported (McDonald 2012), these proportions might be lower than the proportion in the population at large. Indeed, the majority of survey respondents who were affected by sexual harassment or gender discrimination didn’t report it (64% and 60% respectively). Of those who did report, their workplaces supported them a little over half the time, with their manager being supportive only 58 percent of the time and the broader organization only 53 percent of the time. Legal intervention and external agencies were rarely of assistance in resolving the reported issues.

As noted above, gender discrimination can also result in the underrepresentation of some groups in prestigious positions. For example, the approximate ratio of 1 woman in 5 speakers applies to the plenary speakers in several recent wildland fire conferences. The ratio of plenary speakers from ethnic minorities and from various countries has not yet been effectively tracked or tabulated in AFE conferences, but is also likely to be underrepresented. For recent IAWF conferences, women and diversity speakers held a combined 28 percent of plenary speaking slots, with white males holding the other 72 percent.

Because fire is an ecosystem process present worldwide, research on fire should reflect the participation of scientists working in different countries to capture socio-ecosystem differences and understand not only the diverse effects of fire on vegetation, but the ways in which cultures manage fire. However, some countries are clearly underrepresented. In a bibliometric search, using the words “fire” and “forests”, Ibero-American countries contributed 3,004 research manuscripts during the period 2000-2018, of which 2,575 contributions came from only six countries: Spain, Brazil, Mexico, Portugal, Argentina and Chile (fig. 1). Yet, as unbalanced as this number seems, it is overshadowed by the contributions produced in the United States and Canada, with a total

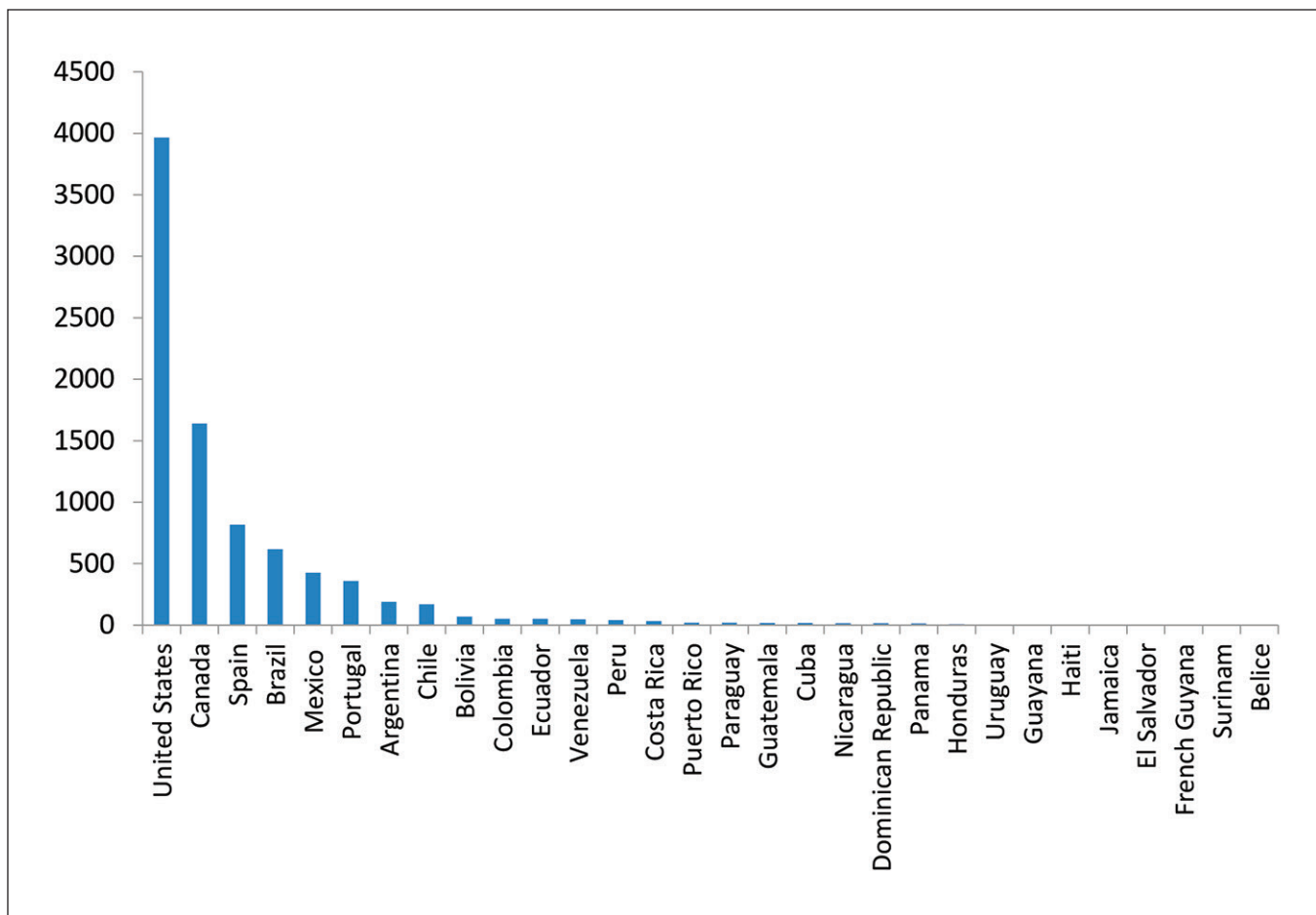


Figure 1—Heterogeneity in the amount of literature concerning forest fires in Ibero-American countries, plus the United States and Canada. The number of publications was generated by searching in Scopus using the words “Fire,” “Forest,” and “Country Name” for the years 2000-2018 (search conducted on May 19, 2018).

of 5606 (fig. 1). Promoting fire research in diverse cultural contexts will benefit the whole scientific community, and would broaden our perspective on the relation between humans and forest fires.

This pattern of underrepresentation is also visible within countries. For example, in Mexico, where the proportion of urban inhabitants has been increasing, legislation regarding forest fires is clearly biased against rural inhabitants (Martínez-Torres and Pérez-Salicrup 2018). Yet, rural inhabitants have used and managed fires historically, and may contribute to avoiding atypically severe large wildfires. By incorporating traditional fire knowledge from rural communities, fire scientists and fire managers would benefit from empirical knowledge that would otherwise be lost.

This is particularly true for the perspectives of women, who are not only underrepresented in all fire-related work (research, management, and planning), but who have been traditionally marginalized. In Mexico, there are only 58 women out of 1,731 individuals in Federal forest fire fighting brigades. Currently, the Federal Government (CONAFOR) and Organizations of the Civil Society (Mexican Fund for the Conservation of Nature) are making an effort to incorporate more women in fire related jobs, yet the greatest challenge is to include women from minorities such as indigenous communities. Implicit bias and gender discrimination appear to be present in Mexican universities as well. Though women in Mexican universities are often perceived as being less productive than their male colleagues due to implicit bias, in fact they are on average 8 percent more productive (León et al 2016).

However, women are less likely than their male peers to be rewarded, with significant barriers to success, including being 35 percent less likely to be promoted at public research centers and with only 11 percent of senior-ranking positions being occupied by women (León 2017).

While working as a wildland firefighter, a traditionally hyper-masculine culture, female firefighters may feel the need to change their personalities to fit in. Sara Brown reported that, “‘fitting in’ with the firefighter culture is essential for safety and a positive work environment”, which she accomplished by creating “a masculine version of myself” (Brown 2017). When other women attempted to join the fire crew, Brown found that she actively eschewed them. In retrospect, she attributed her actions to two theories. The first is tokenism: in a study conducted in the early 1980s, when women in male-dominated firms felt that only a limited number of them would be promoted, they actively competed with each other (Ely 1995). The second theory is that of the Queen Bee: in explaining the near absence of women in the upper echelons of academia, Naomi Ellemers found that women coped with gender discrimination by emphasizing their differences from other females (Ellemers et al 2004). Conditions that foster the Queen Bee syndrome are present on the fireline: women are marginalized, large sacrifices have been made for career, and women may not identify strongly with their gender.

Effects

The AFE survey found that gender discrimination and sexual harassment in the workplace caused numerous impacts to the respondents, who reported negative effects on their career such as needing to change jobs, emotional impacts ranging from depression to anxiety to anger and even “major mental breakdown”, and substance abuse (“I drink a lot!”). Because women had “to fight” to be included in discussions about strategy and tactics, their perspectives were often missing and perhaps discounted when they were allowed to join. Sara Brown reported that while working as a firefighter, she was not able to contribute “many of the positive characteristics that females typically possess”, including “alternative perspectives on risk taking” and accomplishing fireline tasks, and providing emotional support (Brown 2017). This

dynamic leads to domination by some groups and marginalization of other groups, resulting in the omission of some perspectives that could inform better land management, increase firefighter safety, and produce better science, among other things. Thus, perspectives are limited and diversity is stifled, especially in the hyper-masculine culture present on the fireline and in fire camp. Simply put, this matters because ignoring diversity and inclusivity in the practice of scientific research and discovery as well as operational implementation means that access to the full spectrum of talented, creative, problem-solving, and innovative minds that wildland fire management demands is lacking.

Furthering Inclusivity

As a result of the survey findings and the letter regarding plenary session underrepresentation, IAWF and AFE passed resolutions during spring 2018 stating that diversity and inclusivity across gender and a variety of ethnicities and countries of origin shall be a priority in all that the two organizations undertake, including leadership, membership, programs, and activities including recruiting Board members, Associate Journal Editors, and reviewers. The two organizations are currently forming Inclusivity Committees to recognize and monitor the problem, to implement effective actions, and to report to the association Boards regarding accomplishments and status. The goal of the initiative is to begin to shift the culture of harassment and exclusion that prevails not only on the fireline but in other parts of the wildland fire ecology profession. The committees will participate in conference planning to ensure diversity when speakers are selected, monitor diversity in the authors and reviewers of manuscripts for the journals of the two organizations, identify organizational constructs that result in exclusion, and recommend corrective actions.

As leaders of these two organizations work to implement and foster the intent of the resolutions, they are also sensitive about unintended perceptions and outcomes. As Karin Riley, Vice President of AFE, noted in the Fire Continuum Conference plenary session, “We also want to be clear about a few things that this initiative is not. It’s not about blaming any one group or person for the situation. It is about all of

us coming together to shine a light on how conscious and unconscious biases harm our profession. It is about ensuring that differences are embraced, all community members are welcomed, included, and valued, and that we have participation from the widest and most diverse range of wildfire professionals possible.”

The positive outcomes of the initiative are expected to be numerous. As Toddi Steelman, Vice President of IAWF, said during the plenary session, “These values of diversity, inclusivity and equity increase our strength, promote learning, develop our capacity and provide a much-needed example for the next generation of wildland fire managers, professionals and scientists. We do not value diversity, equity and inclusivity for their own sake. We value it because it makes us better in what we do. Greater equity in management will make for better management. Greater diversity in science will make for better science. Greater inclusivity in all we practice will make us better practitioners.”

CONCLUSION

As society continues to grapple with issues of inclusivity and diversity, the wildland fire science and management fields are working toward acknowledging, understanding and tackling these issues directly. Boldly recognizing the critical need for diverse perspectives in the wildland fire profession has led to gaining a better understanding of the challenges the community faces through survey work and other efforts. AFE and IAWF are leading in this arena by passing resolutions that prioritize increasing diversity and inclusivity and establishing working committees to sustain focus, attention, and accomplishment in this area. These efforts are intended to spark a positive and permanent cultural shift that spreads throughout the larger wildland fire profession.

REFERENCES

- Association for Fire Ecology. 2016. Sexual harassment and gender discrimination in wildland fire management must be addressed. <https://fireecology.org/resources/Pictures/AFE%202016%20position%20paper%20on%20discrimination%20final%2011-25.pdf>. [Accessed 2018 September 19].
- Brown, Sara. 2017. Let’s unpack an “uncomfortable” question: Why don’t women in fire universally encourage more women to join fire? Southern Fire Exchange and Association for Fire Ecology: 2017 Fire Congress Research Highlight. https://fireecology.org/resources/Documents/Research%20Highlight_Brown.pdf.
- Ellemers, N.; van den Heuvel, H.; De Gilder, D.; Maass, A.; Bonvini, A. 2004. The underrepresentation of women in science: Differential commitment or the queen bee syndrome? *British Journal of Social Psychology*. 43: 315–338.
- Ely, R.J. 1995. The power in demography: Women’s social constructions of gender inequity at work. *Academy of Management Journal*. 38: 589–634.
- EEOC [Equal Employment Opportunity Commission]. 2016. Discrimination by type. <https://www.eeoc.gov/laws/types/index.cfm>. [Accessed 2016 November 22].
- Feliú-Mójer, Mónica I.; Griffin, Nina; Kirschner, Elliot. 2018. Rethinking the narrative of diversity in science. *Scientific American*. <https://blogs.scientificamerican.com/voices/rethinking-the-narrative-of-diversity-in-science/>. [Accessed 2018 September 19].
- Flood, M.; Pease, B. 2009. Factors influencing attitudes to violence against women. *Trauma, Violence, and Abuse*. 10(2): 125-142. doi: 10.1177/1524838009334131.
- Kobziar, Leda. 2016. Statement of Dr. Leda Kobziar, President, Association for Fire Ecology, Submitted for the Full House Committee on Oversight and Government Reform, Hearing on Examining Sexual Harassment and Gender Discrimination at the US Department of Agriculture, December 1, 2016, 9:00 AM. https://fireecology.org/resources/Pictures/_Congressional%20committee%20testimony%2011-25-2016_final.docx.pdf. [Accessed 2018 September 19].
- Hamburg, M.; Hockfield, S.; Chu, S. 2018. Address harassment now. *Science*. 361: 1167.

- León, Lorena Rivera; Mairesse, Jacques; Cowan, Robin. 2016. An econometric investigation of the productivity gender gap in Mexican research, and a simulation study of the effects on scientific performance of policy scenarios to promote gender equality. United Nations University and Maastricht Economic and Social Research Institute on Innovation and Technology Working Paper #2016-072. <https://www.merit.unu.edu/publications/working-papers/abstract/?id=6327>. [Accessed 2018 September 26].
- León, Lorena Rivera. 2017. Women aren't failing at science—science is failing women. Naturejobs. <http://blogs.nature.com/naturejobs/2017/03/20/women-arent-failing-at-science-science-is-failing-women/>. [Accessed 2018 September 26].
- Lerback, Jory; Hanson, Brooks. 2017. Journals invite too few women to referee. Nature. 541: 455-457.
- Martínez-Torres, L.; Pérez-Salicrup, D.R. 2018. El papel del campesino ante la regulación de los incendios forestales en México: Consecuencias inesperadas. Perspectivas Rurales, nueva época. DOI:10.15359/prne.16-31.5.
- McDonald, Paula. 2012. Workplace sexual harassment 30 years on: a review of the literature. International Journal of Management Reviews. 14(1): 1-17 doi: 10.1111/j.1468-2370.2011.00300.x.
- Perez, Debra J. 2018. Perspective: Women in science—making the invisible, visible. Gordon and Betty Moore Foundation News. February 2018. <https://www.moore.org/article-detail?newsUrlName=perspective-women-in-science---making-the-invisible-visible&tagToFilterBy=ab660061-a10f-68a5-8452-ff00002785c8>.
- Poster, Winifred R. 2018. Cybersecurity needs women. Nature. 555: 577-580.
- Smaglik, Paul. 2018. Fewer women lead top universities. Naturejobs. <http://blogs.nature.com/naturejobs/2018/03/22/fewer-women-helm-top-universities/>. [Accessed 2018 September 19].
- Smith, Alistair M.S.; Kolden, Crystal A.; Prichard, Susan J.; Gray, Robert W.; Hessburg, Paul F.; Balch, Jennifer K. 2018. Recognizing women leaders in fire science. Fire. 1, 30; doi:10.3390/fire1020030.
- Shen, Yiqin Alicia; Webster, Jason M.; Shoda, Yuichi; Fine, Ione. 2018. Persistent underrepresentation of women's science in high profile journals. bioRxiv. doi: <https://doi.org/10.1101/275362>.
- Woolston, Chris. 2018. Where are the female first and last authors? Naturejobs. <http://blogs.nature.com/naturejobs/2018/03/14/where-are-the-female-first-and-last-authors/>. [Accessed 2018 September 26].