



Despite Workforce Diversity Efforts, Career Metrics Differ for Some Demographic Groups in the USDA Forest Service

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ABSTRACT

A diverse, representative workforce is both beneficial and legally mandated for U.S. federal agencies. While previous research documents overall diversity within public agencies, like the USDA Forest Service, little is known about career outcomes and trajectories within these agencies. In this work, we look at individual-level career metrics which reveal patterns in employee retention, advancement, and termination. Using employment data for over 25,000 USDA Forest Service employees, we found that race/ethnicity, gender, and the interaction of these variables significantly related to each career metric. For instance, BIPOC female employees entered at a higher grade but advanced more slowly and spent fewer years with the agency. BIPOC male employees started at lower grades and were more likely to be terminated than any other group. These results suggest that career performance within the Forest Service varies substantially as a function of race and gender. Additional research is needed to uncover why these unequal outcomes occur.

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Introduction

The Civil Service Reform Act of 1978 requires the United States (U.S.) federal government to provide a “federal work force reflective of the Nation’s diversity” (5 U.S.C. § 1101 notes) and to “endeavor to achieve a work force from all segments of society” (5 U.S.C. § 2301(b)(1)). A workforce reflecting society’s diversity is thought to be beneficial for multiple reasons. Riccucci and Van Ryzin (2017) note that representative bureaucracies can increase trust in government, promote accountability, and increase compliance with government programs which in turn affects policy outcomes. Yet analyses of the U.S. federal workforce have shown persistent underrepresentation of women and people of color compared with society-wide demographic data, especially in the leadership ranks (Choi 2011; Henry-Brown and Campbell-Lewis 2005; Riccucci 2009; Sabharwal 2015).

In this paper, we focus on how diversity demographics such as race/ethnicity and gender relate to U.S. federal employees’ career trajectories. In other words, do

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employees' race/ethnicity and gender affect the level at which they are initially hired, how much they advance, how long they stay, and the manner in which they eventually leave the agency? This multi-pronged approach is necessary to understand diversity efforts beyond recruitment and hiring to how race/ethnicity and gender impact employees' tenure at an organization. For instance, the literature on career advancement signals ongoing challenges to diversification within government agencies. Henry-Brown and Campbell-Lewis (2005) documented low numbers of women and people of color in leadership levels and explored possible explanations for these patterns. They suggested (though with no supporting data) that discrimination, systemic factors, and issues related to mobility, with women perceived as less willing to relocate for a promotion, may lead to lack of diversity among organizational leaders (Henry-Brown and Campbell-Lewis 2005).

In a study using a sample of all U.S. federal employees over a 20-year timeframe, Riccucci (2009) found that women and people of color continued to struggle to find upper-level government positions, though there were some gains. Notably, Riccucci was able to assess federal employment data by race/ethnicity and gender:

...for every grade level, there were increases, albeit small, in government jobs for most groups. Women overall increased their employment levels by 4.2 percent. A breakdown by race and ethnicity shows that African American, Latina, and Asian/Pacific Islander women made relatively small gains, while white women decreased their employment levels by 0.2 percent. Latino, Asian/Pacific Islander, and American Indian/Alaskan Native men also made small gains, but the employment of African American men decreased by 0.2 percent and white men by 5.8 percent. (Riccucci 2009, 375)

Riccucci (2009) also found that "White men continued to hold the highest average grade" (376) and that, typically, the employment patterns showed few changes. Mejicano (2020) cautions that using percentages alone to understand changes in federal employment data may show increases in percentages of women and BIPOC (Black, Indigenous, and People of Color) employees despite decreases in their total numbers. Henry-Brown and Campbell-Lewis (2005) reported Merit System Board 1992 data on promotions indicating that men were promoted more than women, and White men and women were promoted more than people of color. Beauregard et al. (2018) found that lower levels of decision latitude and lack of access to higher-level positions (i.e., promotion) resulted in gendered pathways to burnout for women; race/ethnicity was not considered in their study.

The available literature on departures is somewhat sparse, with more research available regarding job satisfaction than how employees leave an organization. Experiences in the workplace affect commitment to an organization, and therefore intention to stay or go. Choi (2009) found that how well diversity is managed in an agency matters for turnover: poor management of diversity, and BIPOC employees have more plans to leave federal service within the year. Choi summarized their findings thus:

Minority employees in more diversified agencies in terms of race/ethnicity were happier with their jobs and had less intention to leave their agencies than whites and vice versa. In a similar line, women in balanced agencies with regard to sex reported lower turnover intention than men. Responses on job satisfaction were not significantly different between men and women. (Choi 2009, 624)

Johnson (2019) documented the many ways that people of color are “pushed out” of environmental organizations. Like Choi (2009), Johnson found that managing for diversity was a critical element in maintaining a diverse workforce in nongovernmental organizations and foundations focused on environmental issues (Johnson 2019). While not addressing intention to leave, Lloyd (2021) found that one-quarter of BIPOC employees reported experiencing discrimination at work.

Addressing gender impacts, Sabharwal (2015) looked at the effects of the “glass cliff” in government employment. The “glass cliff” is the phenomenon of women being put in leadership positions with a high level of risk, and thus being set up to fail. Sabharwal’s findings include that the prevalence of a “glass cliff” varied with the type of agency (distributive or regulatory, for example) and also with the level of control that women had over policy making (Sabharwal 2015). Stazyk, Davis, and Liang (2021) found that while gender was not significant in explaining job satisfaction in the federal workplace, race/ethnicity did carry some explanatory power. Thus, the research that exists so far points to the importance of actively managing diversity in order to retain staff. Effectively managing for diversity might mitigate or counterbalance negative experiences, thereby increasing retention and reducing intention to seek new employment.

Like other agencies, the United States Department of Agriculture, Forest Service (hereafter Forest Service) has pursued diversification of its workforce (Brown and Harris 1993; Kern, Kenefic, and Stout 2015). And, like other agencies, the Forest Service has had uneven results. Past studies of the Forest Service track the transition from a predominantly male and White workforce to one that strives to be more representative of the U.S. population (Brown and Harris 2001; Tipple and Wellman 1991). Yet organizational culture has been difficult to change, and diversification efforts have not always been effective (Brown, Harris, and Squirrel 2010; Kern et al. 2019; redacted.1; Westphal et al. 2022).

Still, over time, the Forest Service has made progress toward diversifying its workforce (Dockry et al. 2022). Several studies point to increased diversity in leadership. Kennedy (1991) surveyed wildlife biologists and fisheries staff from National Forest System (the largest deputy area or division in the organizational structure in the Forest Service). In these studies, women reported higher job satisfaction, identified different reasons than their male counterparts for pursuing the job, and took longer to commit to the agency/career. Women were also more optimistic about career potential. When they encountered career obstacles, they more often attributed them to the new job categories they were in (they were “ologists” not “foresters”) than to gender. Thomas and Mohai (1995) found that Forest Service efforts in the 1980s led to increased diversity, but not in positions heading toward leadership roles. [Redacted.1; Westphal et al. 2022] found that diversity among Forest Service leaders had changed by the 2000s, with increasing numbers of women and BIPOC employees in leadership roles.

However, tallying the numbers at different levels and in different job types tells only part of the diversity story. A more holistic understanding of diversification in an organization also requires analysis of advancement and departures rates. That is, career trajectories must also be examined. How long does it take a female employee to advance compared to male employees? Or a Black, Hispanic, or other BIPOC employees to advance compared to White employees? What about the intersection of race/ethnicity and gender and the associations with initial grade, length of service, advancement, and

departure? In this paper we look at these career trajectory issues, using longitudinal, individual-level data for Forest Service employees whose entire career trajectories can be traced (see below for full data description). Though past studies have reported Forest Service demographic trends (e.g., Brown and Harris 2001; redacted.1), advances here include that:

- These data are a full census of this population, not a sample.
- With the census of employees at the individual level, we were able to analyze the intersection of race/ethnicity and gender.
- By including four key metrics—initial grade, advancement, length of service, and separation type—we present a more holistic picture of career trajectory for each person.

Moreover, these data allow for examining career trajectories while controlling for key confounding factors such as Deputy Area (division within the agency such as National Forest System or Research and Development), Job Field (type of work, grouped by numbered job series), and Grade Level (federal jobs are categorized by grades from entry to senior levels). Our research questions were: How do race/ethnicity and gender relate to metrics of career trajectory (initial grade, advancement, length of service, separation) in the Forest Service, specifically:

1. Are there differences in grade at first hire?
2. What factors relate to grade advancement over time?
3. What factors relate to length of service?
4. What factors relate to type of separation—i.e., involuntary (being fired) or voluntary?

This topic requires a discussion of how people identify in terms of race and ethnicity as well as gender. There are several challenges in doing this well, some presented by our data, some presented by the research questions. The data we analyzed (described in detail below) define the gender variable as binary “male” and “female.” There is a robust discussion in the literature and society at large about gender and even biological sex being non-binary (Hyde et al. 2019; Sanz 2017). Additionally, ideally, our data would allow us to look at subgroups of racial and ethnic identity in detail: Black men and women, Latino and Latina employees, American Indian and Alaska Native men and women, and so forth. These data do not allow this level of detail without risk of revealing individual identity due to the small number of employees in categories such as Native Hawai’ian/Pacific Islander. Therefore, in this paper, we discuss gender as if it were binary and are not able to look at issues facing gender-nonconforming or other gender identities. With regards to race and ethnic identity, we look at two groups in our models: BIPOC employees and White employees. We use “BIPOC” not because it is perfect, but because it does not center White people or make assumptions about population proportions the way that words like “majority” and “minority” do (see Cronin et al. 2021, Box 1). Some data are reported by specific racial and ethnic groups without the risk of identifying individual employees.

Methods

Data

The data used in the current analyses were acquired from the Forest Service's Human Resource Management department. Race/ethnicity and gender data are self-reported by employees; Deputy Area, job series, appointment type, and separation data are recorded by Human Resources staff and updated as needed. The raw data were presented to us in a yearly format for every fiscal year (FY) from 1995 to 2017, with alias identification numbers for each employee (that is, the data were anonymous). These files were collapsed into a flat file containing one record per employee per FY (from October 1 to September 30 of the following calendar year).

Using data provided, we extracted the following additional variables for each employee:

- the first fiscal year (Min FY) they appeared in the database,
- the last fiscal year (Max FY) they appeared in the database (including those that were still active in the agency as of 2017), and
- the number of fiscal years they were active (FY Active).

This was necessary because the Appointment date and Separation date variables in the provided database were unreliable, resulting in negative or zero lengths of service for numerous employees. To bound the data to retain only those employees for whom we had a complete record, we omitted employees who had a Min FY of 1995 (i.e., those whose employment might have begun before 1995) as well as employees who had a Max FY of 2017 (i.e., those whose employment might have continued after 2017). This allowed us to observe the entire career trajectory of an individual employee from hiring to advancement, through length of service and separation. Finally, we subset the data further to retain only employees who had at some point in their tenure with the Forest Service (based on the 20-year bounds of the data) had an appointment type of Permanent and had never been listed as volunteers (i.e., a Grade of 0). Employees did not have to have any minimum years of tenure as permanent employees to be included in the analyses.

The data reductions described above resulted in a dataset containing records for 25,141 employees. Our primary variables of interest—that is, the variables in our dataset that give us insight into an employee's career trajectory at the Forest Service—include (1) Initial Grade (the grade level at which the employee joined the agency), (2) Length of Service (years of employment in the agency during our study period), (3) Advancement (change in grade level over the course of an employee's tenure), and (4) Separation Type (whether the employee left voluntarily or involuntarily). These four metrics encapsulate unique and important aspects of an employee's career. Together, they provide a fairly comprehensive picture of how public servants of different genders and races/ethnicities move through a large federal agency.

Analyses

We used three Analysis of Covariance (ANCOVAs) models to analyze Initial Grade, Length of Service, and Advancement. Each of these models required a slightly different

Table 1. (a and b) Race/ethnicity categories of permanent Forest Service employees whose tenure (first and last year of appointment) fell between the years 1996 and 2016.

(a)	Race and ethnicity categories	
	BIPOC (%)	White (%)
Gender		
Female	1,507 (18.1%)	6,809 (81.9%)
Male	2,780 (16.5%)	14,041 (83.5%)

(b)	Race and ethnicity categories						
	White (%)	African-American (%)	American Indian/Alaskan Native (%)	Asian (%)	Hispanic (%)	Native Hawai'ian/Pacific Islander (NH/PI) (%)	Two or More (%)
Gender							
Female	6,809 (81.9%)	503 (6.0%)	216 (2.6%)	151 (1.8%)	485 (5.8%)	6 (.1%)	146 (1.8%)
Male	14,041 (83.5%)	509 (3.0%)	380 (2.3%)	188 (1.1%)	1,187 (7.1%)	12 (.1%)	504 (3.0%)

Number and percentage of employees are shown for our total population ($N = 25,137$) by (a) BIPOC and White groups and (b) self-reported race/ethnicity, by gender. There were four employees in our data with missing Race and Ethnicity information, so they are not represented in these tables.

set of covariates which we will describe in their respective sections below. We used logistic regression to model Separation Types, as the primary variable of interest was categorical (Voluntary vs. Involuntary). The specific model parameters for each of these analyses are noted in the sections below. All analyses were conducted in R (R Core Team 2020) using its base packages except where specified.

Results

As has been noted in redacted.1, Forest Service employees between 1996 and 2016 skew heavily White and Male. Male employees outnumber female employees 2 to 1, and 83.5% of the male employees are White (Table 1a).

Initial Grade

We conducted a two-by-two analysis of covariance (2×2 ANCOVA) to assess whether our primary demographic variables (i.e., Gender and Race/Ethnicity, both coded as binary variables) were systematically related to the initial grade at which employees began their employment with the Forest Service. The dependent variable was the grade associated with employees' first year of employment and the independent variables were Gender and Race/Ethnicity, and the interaction between these variables. To control for context and changes over time, we included Deputy Area (e.g., National Forest System or Research and Development), Job Field (type of work, such as forester or human resources), Appointment Type (permanent or other type), and Employees' first Fiscal Year (Min FY).

Results from this analysis revealed significant differences in initial grade related to employees' gender ($F(1, 24,964) = 383.46, p < .001$), and the interaction of gender with the binary Race/Ethnicity variable ($F(1, 24,964) = 18.55, p < .001$). We found female employees enter the agency at a higher grade than male employees ($M_{\text{female}} = 6.08, SD_{\text{female}} = 3.12$ vs. $M_{\text{male}} = 5.36, SD_{\text{male}} = 2.97$). In fact, BIPOC female employees

Table 2. (a and b) Career trajectory metrics of permanent Forest Service employees whose tenure (first and last year of appointment) fell between the years 1996 and 2016, excluding those ever recorded as volunteers during that time.

(a)	Variables of interest			
	Initial grade mean (SD)	Length of service (years) mean (SD)	Advancement rate (years to advance a grade) mean (SD)	Odds of involuntarily separating
BIPOC female	6.43 ^a (3.29)	6.52 ^a (5.28)	5.62 ^a (3.32)	1.5 ^b
BIPOC male	5.11 ^b (2.80)	8.05 ^b (5.86)	4.83 ^b (3.43)	2.7 ^c
White female	6.00 ^c (3.07)	8.01 ^b (5.49)	4.54 ^b (3.05)	1 ^a
White male	5.42 ^d (2.99)	9.02 ^c (5.63)	4.08 ^d (3.41)	1.2 ^a

(b)	Initial grade		Length of service (years)		Advancement (years to advance a grade)		% Involuntarily separating %
	Mean	SD	Mean	SD	Mean	SD	
Female							
White	6.00	3.07	8.01	5.49	4.54	3.05	4.17%
African American	7.14	3.50	5.58	4.80	6.96	3.62	7.07%
American Indian/Alaskan Native	6.32	3.22	6.19	5.01	6.36	2.59	7.45%
Asian	7.03	3.39	6.91	5.47	5.49	3.28	2.44%
Hispanic	5.84	3.00	6.88	5.46	5.14	3.54	5.80%
Native Hawai'ian/Pacific Islander	6.33	2.73	8.17	5.91	9.11	5.41	33.33%
Two or more	5.49	2.83	8.66	5.74	3.67	3.52	7.32%
Male							
White	5.42	2.99	9.02	5.63	4.08	3.41	5.11%
African American	5.92	3.18	5.75	4.71	7.09	3.86	18.21%
American Indian/Alaskan Native	5.32	2.77	8.42	6.08	5.66	3.57	12.29%
Asian	6.00	3.38	7.03	5.69	5.80	4.25	6.67%
Hispanic	4.89	2.65	8.20	6.04	4.83	3.47	9.14%
Native Hawai'ian/Pacific Islander	5.33	1.61	4.08	2.47	6.17	5.27	16.67%
Two or More	4.34	2.20	10.22	5.48	3.23	3.02	10.55%

Mean (standard deviation) is reported by (a) BIPOC and White groups and (b) self-reported race/ethnicity, by gender. Different letters within the same column indicate statistically significant differences at $p < 0.01$.

begin their careers at the Forest Service at almost a full grade higher than white, male employees (Table 2a). Due to severely unequal and in many cases insufficient sample sizes (Table 1b), we cannot pinpoint precisely which of the specified Race/Ethnicity groups are driving these results. However, observed values for career metrics (Table 2b) suggest that African American and Asian female employees entered the agency at a higher grade than all other groups ($M_{\text{AfrAmrFemales}} = 7.14$, $SD_{\text{AfrAmrFemales}} = 3.50$, $M_{\text{AsianFemales}} = 7.03$, $SD_{\text{AsianFemales}} = 3.39$). Hispanic male employees, and male employees who identified as Two or More Race/Ethnicity categories, entered the agency at the lowest grade ($M_{\text{HispanicMales}} = 4.89$, $SD_{\text{HispanicMales}} = 2.65$, $M_{\text{TwoOrMoreMales}} = 4.34$, $SD_{\text{TwoOrMoreMales}} = 2.20$).

Length of Service

We conducted a 2×2 ANCOVA to assess whether our primary demographic variables (i.e., Gender as a binary variable and Race/Ethnicity) were systematically related to Forest Service employees' tenure at the agency. The dependent variable in this model

was derived by subtracting employees' Min FY from their Max FY (i.e., the year they last appeared in the HR data minus the year they first appeared). Once again, the model control variables included Deputy Area, Job Field, Appointment Type, and Employees' Min FY.

Results of the analyses revealed a significant main effect of both Race/Ethnicity ($F(1, 24,963) = 224.46, p < .001$) and gender ($F(1, 24,963) = 220.61, p < .001$) and a marginally significant interaction between the two variables ($F(1, 24,963) = 4.479, p = .03$). Female employees had a shorter tenure than male employees ($M_{\text{female}} = 7.74$ years, $SD_{\text{female}} = 5.48$ vs. $M_{\text{male}} = 8.86$ years, $SD_{\text{male}} = 5.68$) and BIPOC employees had a shorter tenure than White employees ($M_{\text{BIPOC}} = 7.51, SD_{\text{BIPOC}} = 5.71$ vs. $M_{\text{White}} = 8.69, SD_{\text{White}} = 5.60$). Planned contrasts revealed that the largest difference in career tenures emerged between White male employees and BIPOC female employees (Table 2a), with White male employees remaining with the Forest Service more than two years longer than BIPOC female employees. Looking at the self-reported Race/Ethnicity categories (Table 2b) suggests that African American male and female employees and Native Hawai'ian/Pacific Islander male employees had the shortest tenures in the agency, with means of 4.08 and 5.75 years, respectively (small sample sizes for Native Hawai'ian/Pacific Islander employees may affect stability of these results). Employees identifying as Two or More Race/Ethnicity categories appear to have the longest tenure for both male and female employees, with means of 10.22 and 8.66 years, respectively.

Advancement

Our next analysis looked at the relationship between Gender and Race/Ethnicity and how much employees advanced over the length of their careers. The Advancement variable was operationalized as Fiscal Years Active/ Δ Grades. Change in grade was computed by subtracting the grade at which employees began their Forest Service careers (i.e., the grade in Min FY) from the grade at which they ended their careers in the agency (i.e., grade in Max FY). We annualized this metric by dividing employees' overall tenure in years (i.e., Length of Service) by the number of grades advanced over their careers.

Similar to the previous two models, a 2×2 ANCOVA was fit to model the effects of Gender and Race/Ethnicity on Advancement, controlling for Deputy Area, Job Field, Appointment Type, and Employees' Min FY. Results revealed significant main effects of Gender ($F(1, 24,963) = 46.88, p < .001$) and Race/Ethnicity ($F(1, 24,963) = 68.18, p < .001$), though no significant interaction between these variables. On average, male employees appeared to advance more than female employees ($M_{\text{male}} = 4.17$ years/grade, $SD_{\text{male}} = 3.45$ versus $M_{\text{female}} = 4.76$ years/grade, $SD_{\text{female}} = 3.13$) and White employees advanced more per year of service than BIPOC employees ($M_{\text{White}} = 4.17$ years/grade, $SD_{\text{White}} = .3.22$ versus $M_{\text{BIPOC}} = 5$ years/grade, $SD_{\text{BIPOC}} = 3.33$). Planned contrasts once again showed the largest differences between BIPOC female employees and White male employees (Table 2a). White male employees advanced a grade in 4.08 years on average. Female BIPOC employees advanced a grade in 5.62 years on average, adding an entire year to advance a full grade compared to White males. That is, White male employees advanced a grade in about 4 years, while BIPOC female employees took approximately 5.6 years to do the same.

This slower rate of advancement for BIPOC female employees appears to hold especially true for African American female employees; their rate of advancement translates to approximately 7 years to advance one grade on average (Table 2b). Native Hawai’ian/Pacific Islander female employees also appear to have a slower rate of advancement than other groups but as this sample consists of six employees, these results cannot be generalized. On the other hand, those identifying as Two or More Race/Ethnicity categories had some of the fastest rates of advancement for both male and female employees, advancing a grade in 3.7 and 3.3 years, respectively, on average.

Separations

The final variable of our career trajectory analysis concerns separation types and frequencies. That is, as we examine a Forest Service employee’s career from start to end, does the way an employee separates from the agency vary systematically with Gender and Race/Ethnicity?

To help us answer this question, we fit a logistic regression using Gender and Race/Ethnicity as predictor variables, and Deputy Area, Job Field, Appointment Type, and Separation Year as controls. The dependent variable in this model was type of separation. In particular, we limited our analyses to include only Voluntary Separation (e.g., Retirements and employees choosing to end their tenure with the agency for a variety of reasons) and Involuntary Separation (i.e., dismissal by the agency) as those are the most relevant for Permanent employees (Table 3). There are other levels of this variable but as they are either irrelevant for permanent employees (i.e., Term or Reduction, indicating the end or reduced hours of a contract position) or occur relatively infrequently (i.e., Death & Disability) they were not included in these analyses.

Results of the logistic regression show that female employees are more likely to voluntarily separate than male employees but importantly, the intersection of Race/Ethnicity and Gender is critical for predicting separation type ($X^2(3, 16,879) = 113.42, p < .001$). Both BIPOC and White female employees were 10–15% more likely to voluntarily separate than their male counterparts. As shown in Table 4, BIPOC employees are significantly more likely to leave involuntarily; about 3% of White employees (both male and female) leave involuntarily while about 5% and 7% of BIPOC

Table 3. Numbers and percentages of permanent Forest Service employees whose tenure fell between the years 1996 and 2016 (excluding those ever recorded as volunteers during that time), by separation type.

Separation type ^a	Number of employees (%)
Voluntary	15,992 (63.6%)
Involuntary	891 (3.5%)
Death and Disability	547 (2.2%)
Reduction	184 (.7%)
Term	7,527 (30.0%)

^aVoluntary = resigning without any adverse disciplinary action; Involuntary is a combination of separation/departure actions (including retire/resign in lieu of adverse action); Death and Disability includes employees who died or became unable to work due to disability; Reduction is being laid off; and Term is the end of a short-term (but not temporary) position (Office of Personnel Management n.d.)

Table 4. Numbers and percentages of permanent Forest Service employees whose tenure fell between the years 1996 and 2016 (excluding those ever recorded as volunteers during that time) by race/ethnicity groups and gender, by separation type.

	Voluntary	Involuntary	Total
BIPOC female	1,127 (94.1%)	71 (5.9%)	1,198
BIPOC male	1,666 (89.7%)	191 (10.3%)	1,857
White female	4,774 (96.0%)	199 (4.0%)	4,973
White male	8,423 (95.1%)	430 (4.9%)	8,853

employees leave involuntarily (female and male, respectively). Put simply: BIPOC employees were—proportionally—being fired or otherwise removed from the Forest Service at nearly twice the rate of White employees during our study period. Specifically, as seen in Table 2b, 18% of African American male employees who left the agency were involuntarily separated compared to only 5% of White male employees—a difference suggesting that African American employees were more than 3 times as likely to be terminated as their White counterparts.

Discussion

In addition to the oft-cited organizational benefits of a racially, ethnically, and gender-diverse workforce—including increased effectiveness, innovation, and productivity (Østergaard, Timmermans, and Kristinsson 2011; Riccucci and Van Ryzin 2017)—having a workforce that is representative of a nation’s population (i.e., representative bureaucracy) is important to public agencies broadly, and natural resource management specifically (Batavia et al. 2020). It is also a legal requirement in the United States (5 U.S.C. § 1101) and a stated goal in other countries as well (Gravier 2008, van Gool and de Zwart 2013). Failure to include people of different racial/ethnic groups and genders among the ranks of those managing communal resources (Batavia et al. 2020) means that the many perspectives and values of the broader public are less likely to be reflected in decision making (Riccucci and Van Ryzin 2017). The demographic diversity of public agencies is thus important not only to the functioning of the agencies themselves, but to ensure social justice and inclusion in resource management (Riccucci and Van Ryzin 2017). For these reasons, our findings not only serve as a case study of career trajectories as they relate to workforce demographics in a U.S. federal agency but provide insight into challenges underlying broader advances in equity and inclusion.

A number of studies have reported disparities in employee demographics in the Forest Service, (e.g., Thomas and Mohai 1995 and redacted.1). That work investigated trends in employee demographics (by race/ethnicity and/or gender, for various time periods) and found that the Forest Service has increased the number and percentage of both female and BIPOC employees, but that growth has been uneven across demographic groups and job fields. Additionally, the gap between gender and race/ethnicity in the Forest Service is larger and growing when compared to the government as a whole and the civilian labor force (Mejicano 2020). Further, diversity has long been low in Forest Service positions that develop into leadership roles (Thomas and Mohai 1995), though recent data suggest improvements in that regard (redacted.1).

Yet any discussion of increases or improvements in Forest Service workforce diversity must be prefaced by the caveat that it is relative to the agency's long history of almost exclusively White male employees (Lewis 2005; Sinclair 2015). In the present study, more than half (56%) of the employee population was White male, slightly more than a quarter (27%) White female, while 11% and 6% were BIPOC male and female, respectively. Among employees in the BIPOC category, numbers of some racial/ethnic groups were so low (e.g., <20 Native Hawai'ian/Pacific Islander employees out of more than 25,000 total employees, Table 2b) that statistical interpretation was precluded. The most numerous racial/ethnic group in the BIPOC category—Hispanic, with 1,672 employees in our study—comprised 6.6% of the population of employees. Despite many years of initiatives aimed at building a diverse workforce, the Forest Service has not yet created a fully representative workforce (redacted.1).

The present study attempts to identify which factors relate to disparities in career trajectories—initial grade, length of service, advancement, and separation. This assessment includes not only White and BIPOC or male and female employees, but the intersection of race/ethnicity and gender. This is important because publicly available data from the Office of Personnel Management report race/ethnicity separately from gender, rather than showing patterns crossed by both race and gender (Mejicano 2020). In addition, previous work has shown that the intersectionality of race/ethnicity and gender, generally defined as a framework to understand how multiple social identities intersect at the micro level of individual experience, affects the representation and experiences of employees (Crenshaw 1989). For instance, studies have shown differences between BIPOC men and White men, and between BIPOC women and White women in perceptions of workplace culture (Nelson and Piatak 2019) and access to leadership roles (Bloch et al. 2021).

Our expectation in an equitable workplace is that there would be no difference in career metrics such as advancement rate and length of service among demographic groups, or that BIPOC employees would show relatively better outcomes as historical inequities are mitigated. Yet our analysis of individual-level longitudinal data for more than 25,000 employees reveals that this is not the case. Race and gender, and the intersection of these variables, is significantly related to the four factors of career metrics discussed here. With the exception of higher initial grade for BIPOC female and White female employees, our results show consistently poorer outcomes for BIPOC male and female—and to a lesser extent White female—employees across all investigated metrics (Table 2a). Furthermore, the higher initial grade of BIPOC female employees did not appear to translate into other career trajectory advantages, while the lower initial grade of BIPOC male employees was compounded by a poorer rate of advancement and shorter tenure than White male employees. Both BIPOC female and male employees had a significantly shorter length of service (more than 2.5 years shorter than White male employees) and significantly slower advancement.

White female employees' metrics were generally better than or equal to those of BIPOC male and female employees, but—with the exception of odds of involuntarily separating—worse than those of White male employees. Odds of involuntarily separating (that is, being terminated) did not differ significantly between White male and White female employees. However, BIPOC employees, both male and female, had

significantly higher odds of being fired (Table 2a). In fact, BIPOC male employees are at least 1.5 times as likely to separate involuntarily as White employees. These findings reflect those assessing discipline applied in school, judicial, and workplace settings elsewhere (Mong and Roscigno 2010; Steffensmeier and Demuth 2000; Wegmann and Smith 2019) with research suggesting that BIPOC men and boys are disciplined more harshly than their White peers.

The differences between BIPOC and White, between male and female, and the intersection of those identities—in addition to the within-BIPOC variation suggested by our data (for which interpretation is complicated by unbalanced and at times small population sizes; Table 2a)—underscore the notion that experiences of broadly categorized demographic groups cannot be generalized (Crenshaw 1989). We reviewed the data to see if job type (such as firefighting) or starting a career in Job Corps (the Forest Service runs several Job Corps programs for hard-to-employ young people) might explain the differences in separation rates. We found no evidence to support this explanation, with employment rates being roughly proportional across race/ethnicity and gender in these categories. Nevertheless, the results are consistent with regard to relative disadvantages for BIPOC male and female employees, and to a lesser degree, White female employees, in multiple metrics of career trajectories. In addition, our findings of these disadvantages, including significantly higher rates of involuntary separation, shed light on some of the dynamics underlying the Forest Service's slow rate of workforce diversification (e.g., redacted.1).

Our finding that length of service was significantly shorter for BIPOC employees, and BIPOC female employees specifically, is important for interpretation of longitudinal trends, or lack thereof (redacted.1), in Forest Service workforce demographic diversity. Though recruiting diverse employees is often used as a stratagem to increase diversity (Thomas 1990; USDA Forest Service 1991), more rapid turnover of positions occupied by BIPOC and/or White female employees undercuts the effectiveness of this effort. It also suggests difficulties related to organizational culture. Kern, Kenefic, and Stout (2015) proposed that the Forest Service, as a hierarchical organization, is more effective at increasing diversity through top-down directives related to hiring than other more loosely coupled organizations, but that this hierarchical structure is an impediment to transforming organizational culture. This is supported in the present study by the longer tenure of White male employees, and by the significantly different frequencies of involuntary separation; BIPOC employees, and especially BIPOC male employees, in our population were more likely to be involuntarily separated. Brown, Harris, and Squirrell (2010) posit possible negative effects of the Forest Service culture on diversification, suggesting that women (and, by extension, BIPOC employees) may leave the agency rather than conform.

Though our analysis did not include testing for differences in our four career trajectory metrics among racial and ethnic groups within the BIPOC category (for reasons described above), some inferences can be drawn from the raw data (Table 2b). It is notable that outside of White male and female employees, only Hispanic male employees make up more than 2% of our population and even then, representation was half that of the Civilian Labor Force (Equal Employment Opportunity Commission 2003). Within the BIPOC category, African American employees often have the poorest

outcomes, with shorter observed mean length of service, slower advancement, and higher frequencies of involuntary separation. Of note, African American male employees in our population were involuntarily separated at a rate of close to 1 out of 5; this is close to four times the involuntary separation rate of White male employees. This is followed closely by Native Hawai'ian/Pacific Islander and Native American male employees, though small population size confounds the interpretation of those demographic groups. Nevertheless, the stark difference in career outcomes between White male and most BIPOC employees suggests disparities that require attention if the Forest Service is to make meaningful advances in workforce diversification.

As discussed earlier, intentional and skilled management of diversity reduces BIPOC employees' intention to leave their federal agency jobs (Choi 2009). Forest Service efforts at managing diversity during the time covered by our analysis were fairly standard, such as observation of History months and perfunctory training around antidiscrimination rules. However, the Forest Service created the Work Environment and Performance Office in 2017, the year our data end (redacted.2). This office is charged with enhancing the work environment, including managing diversity, and offers new training and services that go beyond the former meet-requirements training and aim to better manage diversity. It will be interesting to see if these and related efforts improve Forest Service diversity management sufficiently to change the trajectories we found, with BIPOC employees heading to the door, voluntarily or otherwise. There is much at stake—as others have shown, a diverse federal land management organization is one that is more effective because it is perceived as legitimate, trustworthy, and can create more inclusive policies. By addressing these issues, the Forest Service has an opportunity to serve as an exemplar for other land management agencies across the world who face similar challenges with promoting diversity, equity and inclusion (Johanssen, Johanssen, and Andersson 2018).

Conclusion

Our results suggest that each stage of an individual's Forest Service career trajectory does vary with respect to race/ethnicity and gender. One striking observation: despite entering the agency at a higher grade than their peers, BIPOC women have a shorter tenure and advance less. BIPOC employees (both men and women) are also separated involuntarily from the agency at a higher rate than White employees. A caveat, however: our data tell us *what* happened, not *why* it happened. Additional research looking at why employees chose to leave before retirement, and why some were involuntarily separated, would shed important light on some of the patterns our analyses uncovered. This study provides insights that could support decreasing the disparities in career trajectories among BIPOC and women employees and support diversity management goals within the Forest Service.

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