

Research Article - social sciences

# USDA Forest Service Employee Diversity During a Period of Workforce Contraction

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## Abstract

We analyzed USDA Forest Service (Forest Service) employment data from 1995 to 2017, by race and ethnicity, gender, as well as race/ethnicity *and* gender, to assess progress towards the Forest Service's goal of achieving a multicultural workforce that reflects the US population. We look at the trends by an employee's level in the Forest Service and by branch of the Forest Service. Our data show an overall decrease in the workforce by nearly 20%, an increase in diversity in Forest Service leadership levels, little change in the percentage of employees in non-White racial/ethnic groups combined, the number of Black employees decreased, and the number of women in lower grades and in the National Forest System Deputy Area decreased. Comparison with the civilian labor force provides additional context. Implications are relevant beyond the Forest Service, including a risk of losing public trust and reduced agency effectiveness if a representative workforce is not achieved.

**Study Implications:** Like other land management agencies, the USDA Forest Service aims for workforce diversity to help meet its mission to serve the American people. Assessing progress toward meeting diversity goals is key and looking at Forest Service employee demographic data over a 22-year period (1995–2017), we find mixed results. The Forest Service workforce has declined in overall numbers and has lost representative diversity in many gender, race, and ethnicity categories. However, some sections of the agency, such as leadership grades and business operation positions, have increased representative diversity. Slow progress in meeting diversity goals may limit the effectiveness of the Forest Service and the public's trust in the agency (and other public land management agencies), especially if diversity of perspective and thought among employees is not also supported. More work is needed to evaluate why progress toward Forest Service diversity goals has been uneven. In particular, these data do not tell us about how the presence or absence of representative diversity affects the quality of people's experiences as agency employees, or why people either leave or stay with the agency over time.

**Keywords:** diversity, multiculturalism, Forest Service, workforce, employment

The goal of a diverse workforce is common across natural resource fields, including in the USDA Forest Service (hereafter Forest Service; [Batavia et al. 2020](#)). The Forest Service's vision statement on the webpage "What We Believe" ([USDA Forest Service 2021](#)) states:

*"We are a multicultural and diverse organization. ... All employees are respected, accepted, and appreciated for their unique and important contribution to the mission."*

These are not new goals. The 1991 Forest Service report *Toward a Multicultural Organization* lists "conversion of the Forest Service into a multicultural organization" as a goal and provides this vision of the future work environment:

*The Forest Service is multicultural and diverse. Employees work in a caring and nurturing environment in which leadership, power, and influence are shared. All employees are respected, appreciated, and accepted for their contributions and perspectives.* ([USDA Forest Service 1991](#), p. iii).

[Batavia and colleagues \(2020\)](#) reviewed diversity-related articles in forestry, wildlife, and other natural resources fields. They found four primary arguments in favor of diversity, several of which are implied in the Forest Service statements above and can be found across the US federal government ([Bradbury 2011](#)). Forest Service reasoning often echoes Batavia and colleagues, especially the argument that the agency should create a workforce that represents a diverse society, and that staying relevant in a diverse society requires a diverse workforce ([Brown et al. 2010a](#), [Batavia et al. 2020](#)). However, to fully achieve the goals of representation and relevance, they argue, more than numbers is required; employees from nondominant groups must also have a voice in shaping policies and programs ([Batavia et al. 2020](#)). These authors also point out that the focus on race, ethnicity, and gender is important, but far from a full capturing of attributes that contribute to diversity and argue for consideration of (dis)ability, sexual orientation, class, religious perspective, and the interaction of these various factors in promoting diversity in the workforce ([Batavia et al. 2020](#)).

The concept of the intertwined effects of multiple individual attributes on a person's lived experience is called intersectionality ([Crenshaw 1989](#)). A term coined by Crenshaw in 1989, intersectionality is critical in understanding the complexity of diversity and inclusion. Intersectionality is not merely additive (e.g.,

race + gender), but also investigates the way that existing policies and societal forces deny difficulties faced by, for example, Black women that are not faced in the same way by White women or by Black men. Crenshaw analyzes several discrimination cases brought by Black women to explicate the ways in which intersectionality of race and gender can further marginalize some people, and her argument focuses on the lives of Black women; however, intersectionality is relevant for the many facets of identity that shape the experiences of many of society's subgroups. Intersectionality calls for analyzing issues of diversity with as much detail and nuance as any dataset allows.

Although the Forest Service has goals of a representative workforce, not unlike other organizations, it has had both successes and difficulties achieving this and related diversity goals ([USDA Forest Service 1991](#), [Bosworth 2006](#), [Brown et al. 2010a](#)). Several studies have explored trends in Forest Service employee race/ethnicity and gender demographics, allowing a partial assessment of the Forest Service's progress towards building a multicultural organization. [Thomas and Mohai \(1995\)](#) assessed Forest Service employment data from 1983 to 1995 (these data were reported separately for gender and for employees of color as a whole) and found that the Forest Service increased the number and percentage of both female employees and employees of color, but that growth was uneven across job types, with continued low numbers in positions that develop into leadership roles ([Thomas and Mohai 1995](#)). [Brown, Harris, and Squirrell](#) have several publications investigating changes in the Forest Service workforce, with an emphasis on gender and on new disciplines (e.g., wildlife biologists) being hired in response to changing laws and societal expectations ([Brown and Harris 1993, 2001](#), [Brown et al. 2010a, 2010b](#)). [Brown and colleagues'](#) analysis show an increase in female Forest Service employees in the 1990s, and some movement of female employees into leadership positions ([Brown et al. 2010b](#)). [Brown and colleagues](#) also identified two attitudinal differences between male and female employees, as well as a decline in these differences over time. First, female employees were more supportive of ecosystem services-oriented management than they were of management for timber across surveys administered over several years ([Brown et al. 2010b](#)). Additionally, female employees were more likely to agree that diversification created a more capable workforce, whereas male employees were more likely to disagree ([Brown](#)

et al. 2010b). However, these differences narrowed in the 2000s and as women gained leadership positions (Brown et al. 2010b). Combined, these studies show modest progress and also continued issues with diversification within the Forest Service.

In this article, we report on analysis of Forest Service employment trends using longitudinal data for every employee working for the agency from 1995 to 2017. We summarize our data (described below) by race and ethnicity, gender, and importantly, the intersections between race/ethnicity and gender. We further explore the data by grade group (a.k.a. pay grade, General Service level, or GS level) and deputy area.

## Data and Methods

We obtained employment data from the Forest Service's Human Resources Management office. Digitized data were reliable starting in the mid-1990s, so our data cover the period 1995–2017. The data were pulled for a given day each year (e.g., December 1, 1995, 1996, etc.). Therefore, we have an annual snapshot of all employees (excluding those employed for less than one year), with one anonymized record for each person employed on that specific day. This paper describes the Forest Service employment picture over time using descriptive statistics.

We briefly describe the data here; a full description is available in the [Supplemental Materials](#). Job-related variables in the dataset included deputy area (National Forest System; State and Private Forestry; Research and Development; Business Operations; and Office of the Chief, which includes Law Enforcement), job series, and job grade level. Demographic variables in the dataset include age, self-reported race and ethnicity, and gender. These data used the US Office of Personnel Management race and ethnicity categories of White, Black/African American, Asian, American Indian/Alaska Native, and Native Hawai'ian/Pacific Islander, and Two or More (U.S. Office of Personnel Management 2020). The category Two or More races/ethnicities was added by the Census in 2000 and first appears in our data then too. The ethnicity category is Hispanic/Latino (U.S. Office of Personnel Management 2020). Gender is binary in these data.

We created a variable “grade group” to facilitate analysis of positions from entry level to leadership (see [Supplemental Materials](#) for details). “Grade group” reduced the general series (GS) grade information to three categories: GS1-8, GS9-12, and GS13-15. These groups reflect the level of decision making and

leadership typical to positions in these grades. Senior Executive Service is not included in the analyses by grade group (Senior Executive Service is a cadre of leaders “just below the Presidential appointees” per the U.S. Office of Personnel Management, 2021).

Where useful, we draw on Bureau of Labor Statistics data on the civilian labor force for comparison and context. The Forest Service (and all other federal agencies) are required to report comparisons to the civilian labor force figures, with a goal of matching the civilian labor force statistics as closely as possible (Equal Employment Opportunity Commission 2003).

## Results

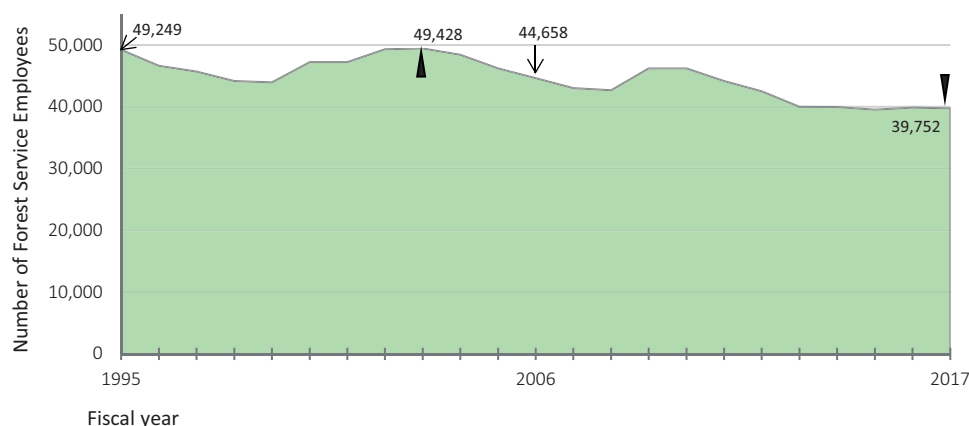
The following summarizes Forest Service employment trends and characteristics between 1995 and 2017. We first present the data for the entire Forest Service by race/ethnicity, then by gender, then by both race/ethnicity and gender. Then we present the demographic data by grade groups and by deputy area, each, again, by race and ethnicity, then by gender, and lastly by both race/ethnicity and gender. When our analysis requires discussing Black, Hispanic, Asian, American Indian/Alaska Native, Native Hawai'ian/Pacific Islander, and Two-or-More employees collectively, we use the term BIPOC (Black, Indigenous, and Person of Color). Whenever possible, we discuss specific groups (e.g., American Indian/Alaska Native). Likewise, we use “male” and “female” as the data we received was binary for gender and used these terms. We recognize the shifting language used to discuss issues of diversity and that there is no perfect approach to terminology. When a subgroup had between one and five employees in it for any given analysis, we set the number at five to protect the anonymity of people within those subgroups.

### Overall Dataset

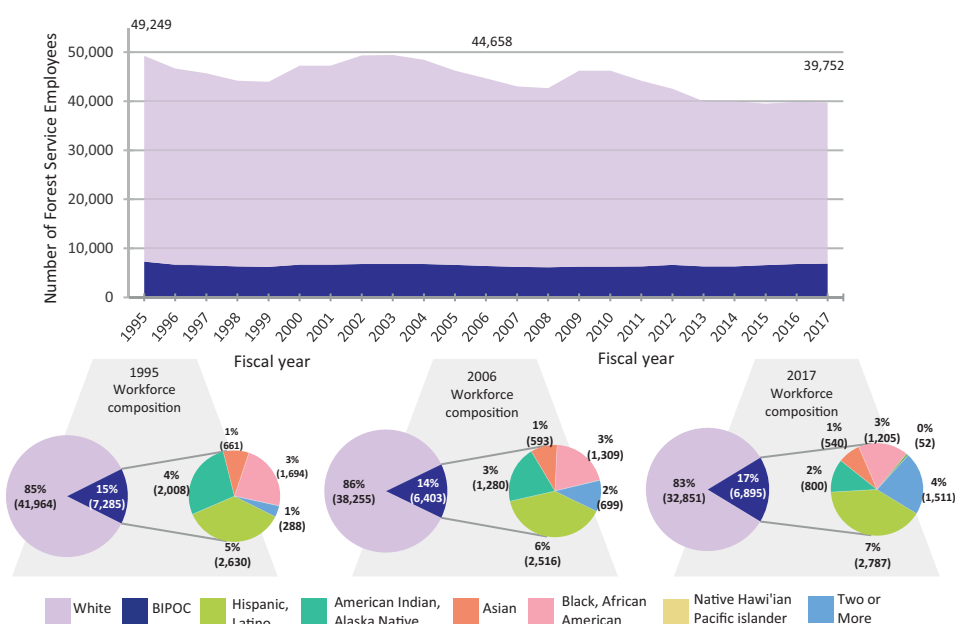
The total number of Forest Service employees has declined by nearly a quarter over the 22 years in these data ([Figure 1](#)), from 49,249 employees in 1995 to 39,572 in 2017. This is a decline of close to 9,500 employees (19.3%).

### Forest Service Employees by Race and Ethnicity

The percentage of employees who identified as White only (not Two or More) slightly declined from 85% in 1995 to 83% in 2017 ([Figure 2](#)). The percentage of Hispanic/Latino employees in the Forest Service workforce grew slightly, from 5% in 1995 to 7% in 2017. The same pattern is seen for employees who identified



**Figure 1.** Total Forest Service workforce from 1995–2017. High and low employment years marked with an arrow.



**Figure 2.** Forest Service workforce 1995–2017, showing number and percent of employees who identify as White, Black, Hispanic, Asian, American Indian/Alaska Native, Native Hawai'ian/Pacific Islander, and Two or More.

as Two or More race/ethnicity categories, a new category in 2000. By 2017, 4% of the workforce identified as Two or More. The percentage of employees who identified as American Indian/Alaska Native declined by half over this time, from 4% in 1995 to 2% in 2017. The percentages of both Black and Asian employees remained relatively stable across the years, at 3% and 1%, respectively. However, there was a greater decline in the number of White employees, down nearly 22% by 2017. The number of employees who identified within the BIPOC category declined by a little over 5%, but there was variation, with increases in those identifying as Hispanic/Latino and Two or More, and declines for Black/African American, Asian, and American Indian/Alaska Native. Figure 2 depicts these

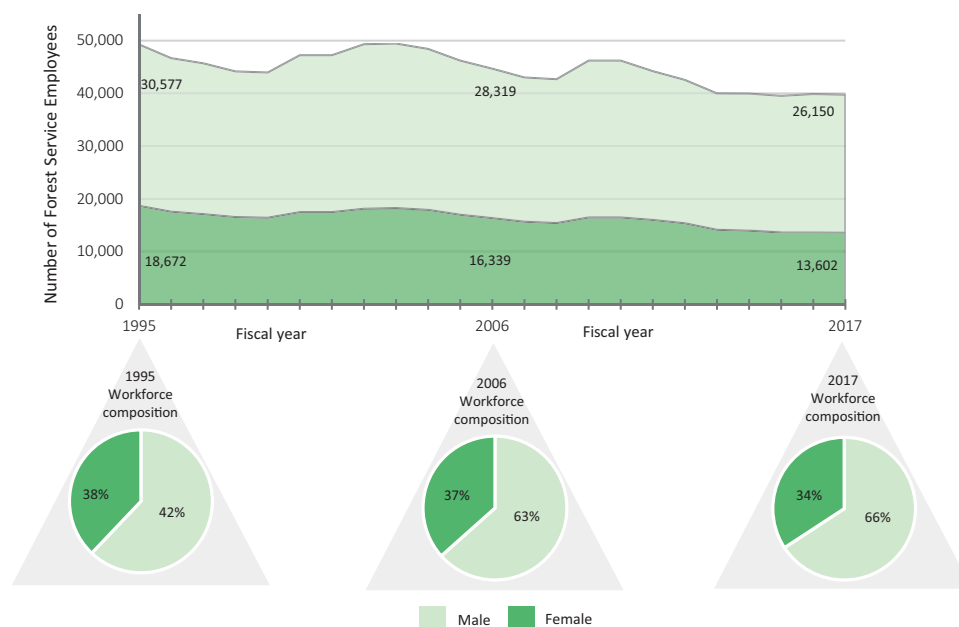
data, with pie charts highlighting racial and ethnic diversity in 1995, 2006, and 2017.

### Forest Service by Gender

Looking at the overall dataset by gender, we find greater decline in the number of female employees than male (Figure 3). There was a 27% decline in female employees compared with a 14% decline in the number of male employees between 1995 and 2017 (Figure 3). As a result, the overall percentage of male employees increased from 62% to 66% by 2017.

### Forest Service by Race/Ethnicity and Gender

Looking at the intersection of race/ethnicity and gender in the Forest Service-wide data, we find that percentages



**Figure 3.** Forest Service workforce 1995–2017, showing number and percent by gender.

of White male and White female employees were relatively stable across the time period, both showing small declines, whereas the total number of these employees decreased by thousands. When we look at the data for BIPOC employees, we find a rise in the number and percentages of both male and female Hispanic employees, as well as those who identify as Two or More race/ethnicity categories (Figure 4). The Forest Service had slightly more female than male Black employees over the whole time period. The number of Asian employees was essentially flat across the years for both male and female employees. There was a slight decline in employees identifying as American Indian/Alaska Native among both male and female employees and a slight increase in the number of employees who identified as Hawai’ian Native/Pacific Islander.

Another way to look at the overall Forest Service employment data is by comparison with the civilian labor force. Table 1 displays the Forest Service workforce data for 1995, 2000, 2005, 2010, 2015, and 2017 broken down by race, ethnicity, and gender. Civilian labor force percentages from decadal calculations in 1990, 2000, and 2010 are included for comparison. There are groups consistently less represented in the Forest Service workforce, such as Black/African Americans and females, and several groups where the Forest Service employs a higher percentage than in the civilian labor force, such as American Indian/Alaska Natives and Two or More.

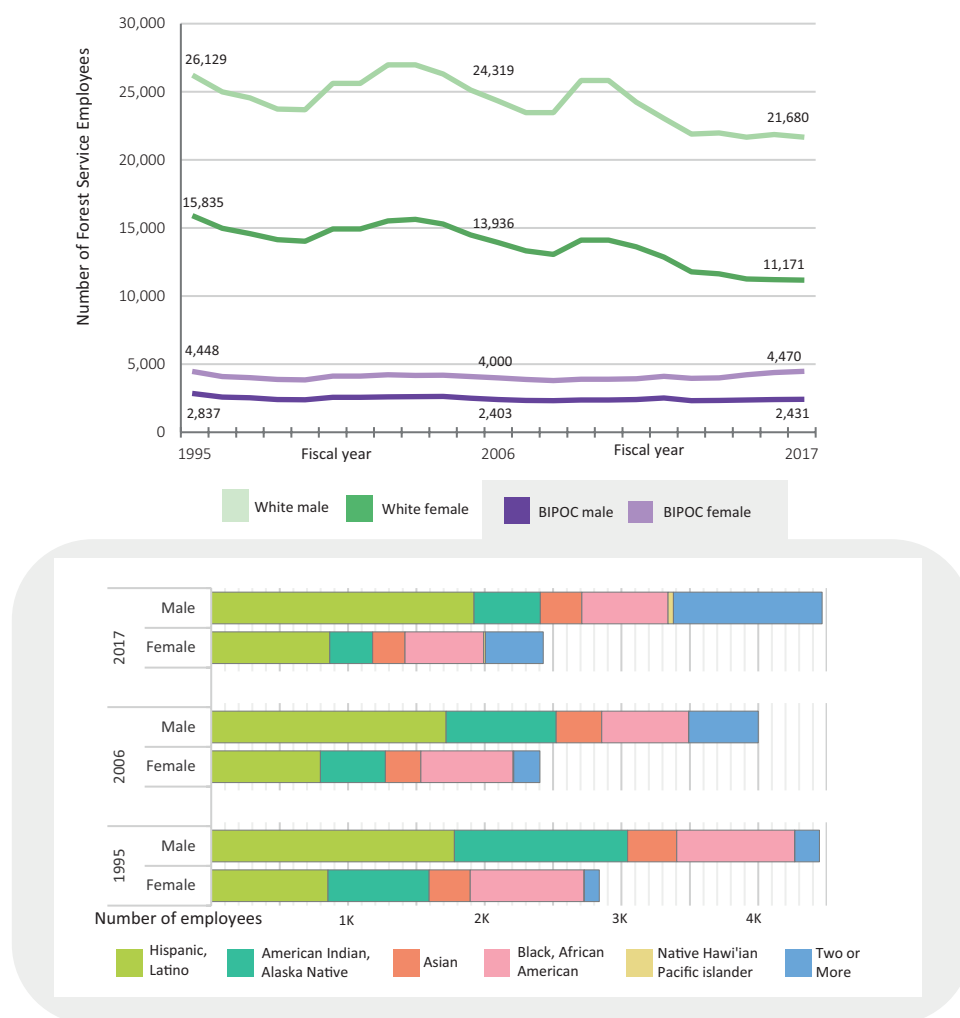
## Grade Group

Recall that we created a variable called “grade group” that categorizes the General Schedule grades 1–15 into grade groups 1–8, 9–12, and 13–15. The data do not suggest meaningful shifts in the percentages of employees in each grade group (Figure 5). The number and percentage of Forest Service employees in the higher grades (GS13–15) was relatively stable. There was a small decline in the number of employees in positions in the grade group GS9–12. Although there was a decline in the number of employees in the GS1–8 grade group, employees in these lower-graded positions remained the largest group every year.

## Grade Group by Race/Ethnicity

Looking at race and ethnicity by grade group, diversity nearly doubled on a percentage basis in the GS13–15 grade group, moving from 11% BIPOC employees in 1995 to 19% in 2017. Specifically, there were more employees who identified as Hispanic/Latino, Asian, Black/African American, and Two or More in positions in grades 13–15. There were some increases in racial and ethnic diversity in the other two grade groups as well, but these increases were not as substantial (Figure 6A and B).

As a percentage of employees in grades 1–8, the number of Hispanic/Latino employees shrank in the late 2000s, then increased by 2017, and the number of Two or More employees consistently increased throughout the



**Figure 4.** Forest Service workforce 1995–2017, gender by race and ethnicity. The top graph compares White employees to Black, Indigenous, Person of Color (BIPOC) employees collectively. The bar chart provides detail of the number of male and female employees by race and ethnicity categories for three years: 1995, 2006, and 2017. Note that White employees were removed from the bar charts to improve legibility of results for race and ethnicity categories with small population sizes.

study period. Of employees in grades 9 through 12, the percentage of White employees steadily decreased from 1995 to 2017, whereas Hispanic/Latino, Black/African American, and Two or More employees modestly increased as a percent of the workforce in this grade group.

#### Grade Group by Gender

Similar to the findings of racial and ethnic diversity and grade group, there was an increase in female employees in the GS13–15 grade group (Figure 7). In contrast, the GS1–8 grade group shows an almost 50% decline in female employees whereas the number of female employees is essentially flat in the middle grade group. As a result, the ratio of male to female employees changed slightly in the GS9–12 grade group from 2:1 in 1995 to 1.5:1 in 2017, increased in the GS1–8 grade group

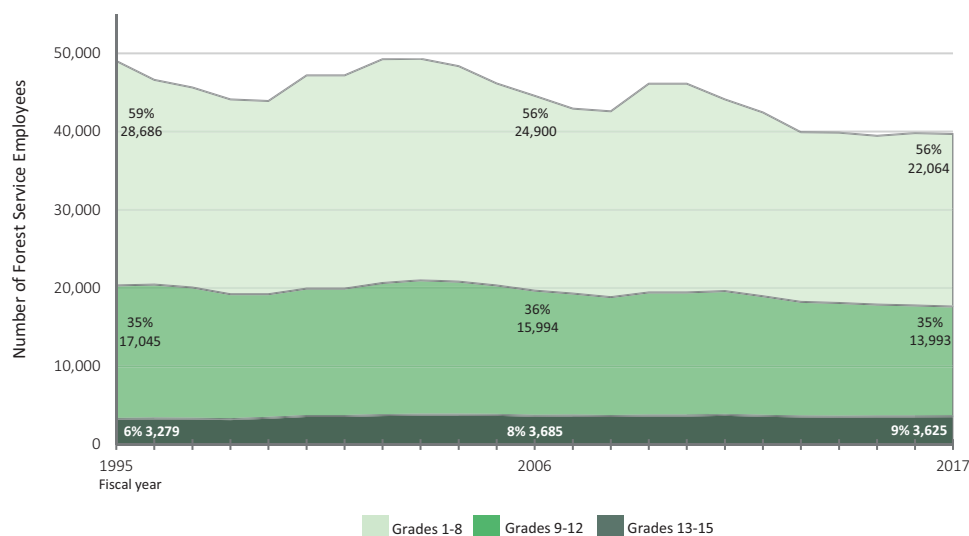
from 1.35:1 to 2.4:1, and decreased in the GS13–15 grade group from 3.6:1 to 1.4:1.

#### Grade Group by Race/Ethnicity and Gender

Looking at grade group by both race/ethnicity and gender shows a decline in female employees in grades 1–8 but a modest and then more substantial increase in grade groups 9–12 and 13–15 (Figure 8). The pattern holds for both White and BIPOC female employees, with increases seen across all the race and ethnicity categories except White. The number of BIPOC male employees also grew in grades 13–15, with the largest increase among employees identifying as Hispanic/Latino or Two or More, and more modest increase among those identifying as Asian or Black/African American. Overall, more males than females identified

**Table 1.** Forest Service workforce by race and ethnicity and gender by fiscal year (FY) compared with the civilian labor force (CLF; bold rows). Any cell with a value greater than 0 but less than 5 is recorded as 5.

| FISCAL YEAR | RACE & ETHNICITY       |        |                    |       |        |        |                           |       |        |       |                                           |       |                                  |       |                   |       |        |
|-------------|------------------------|--------|--------------------|-------|--------|--------|---------------------------|-------|--------|-------|-------------------------------------------|-------|----------------------------------|-------|-------------------|-------|--------|
|             | Non-Hispanic or Latino |        |                    |       |        |        |                           |       |        |       |                                           |       |                                  |       |                   |       |        |
|             | TOTAL WORKFORCE        |        | Hispanic or Latino |       | White  |        | Black or African American |       | Asian  |       | Native Hawaiian or Other Pacific Islander |       | American Indian or Alaska Native |       | Two or More Races |       |        |
|             | All                    | Male   | Female             | Male  | Female | Male   | Female                    | Male  | Female | Male  | Female                                    | Male  | Female                           | Male  | Female            | Male  | Female |
| FY 2017     | 35,672                 | 23,348 | 12,324             | 1,867 | 890    | 18,557 | 9,788                     | 716   | 616    | 388   | 293                                       | 96    | 27                               | 926   | 489               | 795   | 218    |
|             | 100%                   | 65.45% | 34.55%             | 5.23% | 2.49%  | 52.02% | 27.44%                    | 2.01% | 1.73%  | 1.09% | 0.82%                                     | 0.27% | 0.08%                            | 2.60% | 1.37%             | 2.23% | 0.61%  |
| FY 2015     | 36,481                 | 23,744 | 12,737             | 1,907 | 884    | 19,083 | 10,194                    | 742   | 655    | 357   | 280                                       | 95    | 29                               | 968   | 529               | 589   | 163    |
|             | 100%                   | 65.09% | 34.91%             | 5.23% | 2.42%  | 52.31% | 27.94%                    | 2.03% | 1.80%  | 0.98% | 0.77%                                     | 0.26% | 0.08%                            | 2.65% | 1.45%             | 1.61% | 0.45%  |
| FY 2010     | 40,128                 | 25,555 | 14,573             | 1,632 | 796    | 21,788 | 12,220                    | 708   | 641    | 330   | 265                                       | 44    | 27                               | 940   | 558               | 97    | 52     |
|             | 100%                   | 63.68% | 36.32%             | 4.07% | 1.98%  | 54.30% | 30.45%                    | 1.76% | 1.60%  | 0.82% | 0.66%                                     | 0.11% | 0.07%                            | 2.34% | 1.39%             | 0.24% | 0.13%  |
| CLF (2010)  | 100%                   | 51.86% | 48.14%             | 5.17% | 4.79%  | 38.33% | 34.03%                    | 5.49% | 6.53%  | 1.97% | 1.93%                                     | 0.07% | 0.07%                            | 0.55% | 0.53%             | 0.26% | 0.28%  |
| FY 2005     | 40,081                 | 25,247 | 14,834             | 1,941 | 862    | 21,242 | 12,412                    | 674   | 700    | 365   | 276                                       | 5     | 7                                | 1,003 | 566               | 19    | 9      |
|             | 100%                   | 62.99% | 37.01%             | 4.84% | 2.15%  | 53.00% | 30.97%                    | 1.68% | 1.75%  | 0.91% | 0.69%                                     | 0.01% | 0.02%                            | 2.50% | 1.41%             | 0.05% | 0.02%  |
| FY 2000     | 38,814                 | 24,146 | 14,668             | 1,568 | 766    | 20,510 | 12,310                    | 669   | 701    | 325   | 263                                       | 5     | 5                                | 1,064 | 623               | 7     | 5      |
|             | 100%                   | 62.21% | 37.79%             | 4.04% | 1.97%  | 52.84% | 31.72%                    | 1.72% | 1.81%  | 0.84% | 0.68%                                     | 0.01% | 0.01%                            | 2.74% | 1.61%             | 0.02% | 0.01%  |
| CLF (2000)  | 100%                   | 53.20% | 46.80%             | 6.20% | 4.50%  | 39.00% | 33.70%                    | 4.80% | 5.70%  | 1.90% | 1.70%                                     | 0.10% | 0.10%                            | 0.30% | 0.30%             | 0.50% | 0.40%  |
| FY 1995     | 43,309                 | 26,525 | 16,784             | 1,564 | 830    | 22,600 | 14,127                    | 732   | 761    | 326   | 288                                       | 5     | 5                                | 1,300 | 776               | 5     | 5      |
|             | 100%                   | 61.25% | 38.75%             | 3.61% | 1.92%  | 52.18% | 32.62%                    | 1.69% | 1.76%  | 0.75% | 0.66%                                     | 0%    | 0%                               | 3.00% | 1.79%             | 0%    | 0%     |
| CLF (1990)  | 100%                   | 54.22% | 45.72%             | 4.77% | 3.35%  | 42.64% | 35.30%                    | 4.95% | 5.45%  | 1.51% | 1.32%                                     | NA    | NA                               | 0.35% | 0.30%             | NA    | NA     |



**Figure 5.** Forest Service workforce 1995–2017, showing grade group composition over time.

as Two or More. There are decreases in the number of White males in all grade groups.

### Deputy Area

The Forest Service is organized by deputy areas (divisions led by a Deputy Chief): The National Forest System, Research and Development, State and Private Forestry, Business Operations and Finance, and the Office of the Chief (which includes Law Enforcement). Looking across the deputy areas between 1995 and 2017, there is a notable decline of nearly half (48%) of total employees in Research and Development; the National Forest System saw a decline of nearly a quarter (24%), but some of these positions likely shifted to Business Operations when the centralized administrative unit known as the Albuquerque Service Center was created in 2006. State and Private Forestry increased slightly from 348 in 1995 and to 423 in 2017. Yet this deputy area is small enough that it represented 1% of the overall Forest Service workforce in all years (Figure 9).

### Deputy Area by Race and Ethnicity

Figure 10A shows the race and ethnicity of the Forest Service workforce, whereas Figure 10B depicts the same information but without White employees, to better see the specific race/ethnicity identity categories. Both figures depict the numbers in 1995, 2006, and 2017.

Within the BIPOC categories, the pattern within the National Forest System changed somewhat, with the same increase in Two or More seen elsewhere,

and, for the first time in our data, a small number of Native Hawai'ian/Pacific Islander employees in 2017. However, the overall number of employees in the BIPOC category declined in the National Forest System, with the largest declines among Black/African American employees and American Indian/Alaska Native employees. Research and Development also lost diversity over the years.

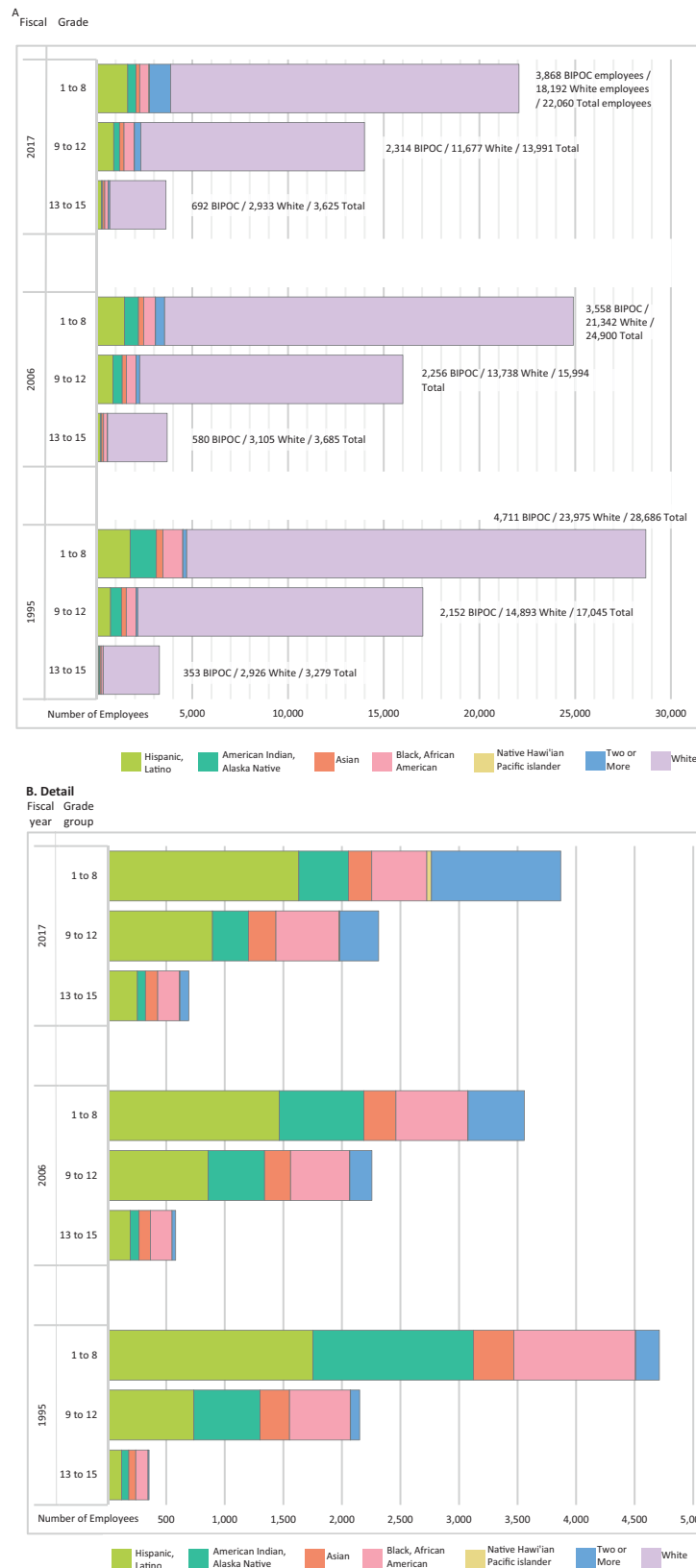
The Office of the Chief (including Law Enforcement) increased in diversity, growing from 16% BIPOC employees in 1995 to 29% in 2017. Black/African American and Hispanic/Latino employees showed the largest growth. Business Operations also grew overall, and in diversity, with the largest gains among Hispanic/Latino employees.

### Deputy Area by Gender

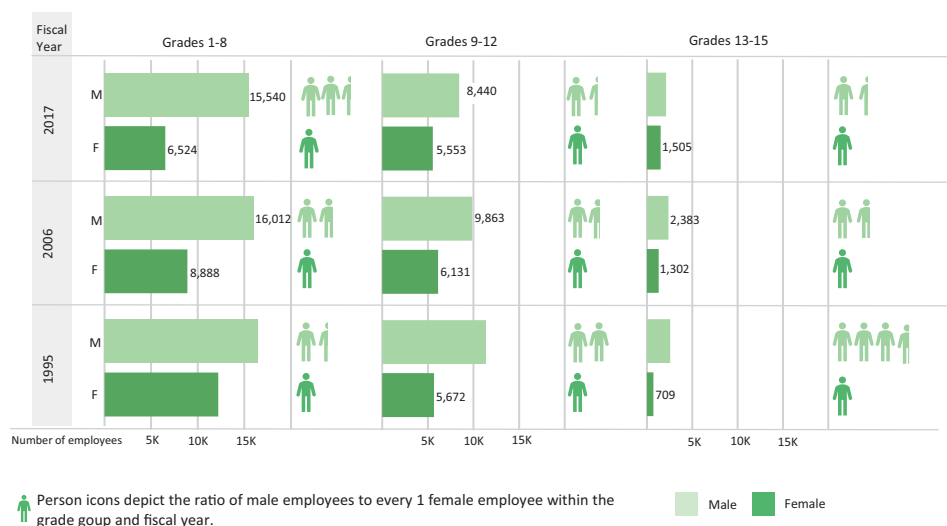
State and Private Forestry has the strongest record regarding gender equity. This deputy area has consistently been roughly half female employees. Most deputy areas grew slightly in the percentage of female employees. Business Operations & Finance and the Office of the Chief increased their percentage of female employees the most (Figure 11). However, the National Forest System, by far the largest of the deputy areas, lost female employees. The ratios for each deputy area, compared across 1995 and 2017, are in Table 2.

### Deputy Area by Race/Ethnicity and Gender

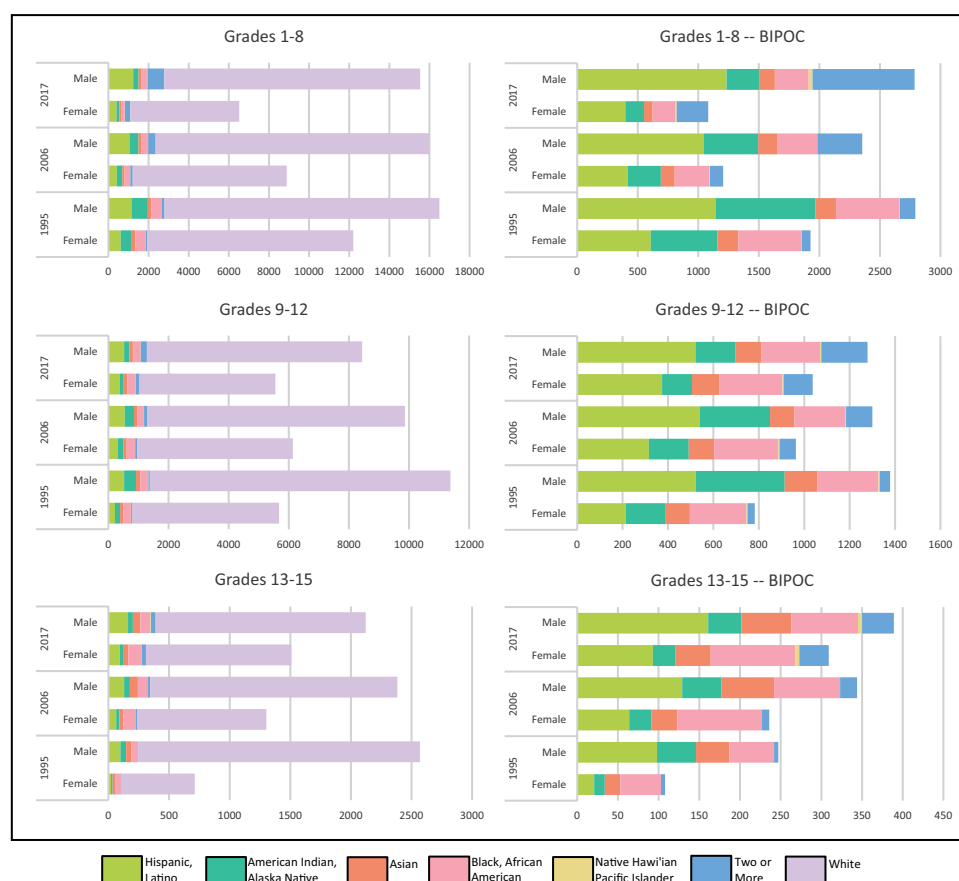
As depicted in Figure 12, Business Operations & Finance increased in number of staff and also in gender and overall diversity, with a notable increase in both male and female Hispanic/Latino employees. The



**Figure 6.** a: Forest Service workforce by grade group and race and ethnicity in fiscal years 1995, 2006, and 2017, including White employees. b: Detail of Forest Service workforce by grade group and race and ethnicity in fiscal years 1995, 2006, and 2017; Hispanic, American Indian/Alaska Native, Asian, Black/African American, Native Hawai'ian/Pacific Islander and Two or More employees. BIPOC: Black, Indigenous, Person of Color.



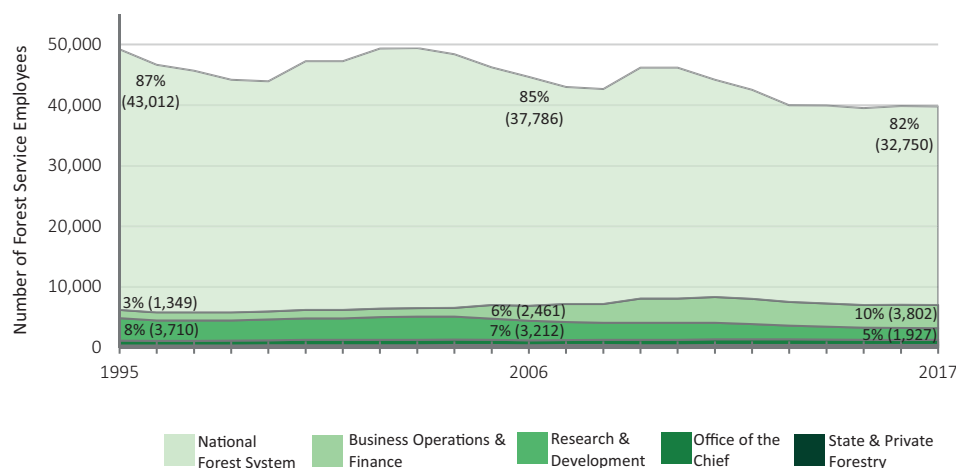
**Figure 7.** Forest Service workforce by grade group and gender in fiscal years 1995, 2006, and 2017.



**Figure 8.** Forest Service workforce by grade group by race and ethnicity and gender for fiscal years 1995, 2006, and 2017. Graphs on the left include White employees. Graphs on the right detail Hispanic, American Indian/Alaska Native, Asian, Black/African American, Native Hawai'ian/Pacific Islander and Two or More employee data to allow easier analysis across subgroups and years. Note that the scale of the X-axis is different in each graph.

National Forest System lost female employees, particularly American Indian/Alaska Native and Black/African American women. The number of male BIPOC

employees in the National Forest System fluctuated, with a decline in American Indian/Alaskan Native male employees and a rise in the number of male employees



**Figure 9.** Forest Service workforce 1995–2017 showing deputy area composition over time.

identifying as Two or More. The Office of the Chief grew in female employees, including increases in employees identifying as Hispanic/Latina, Black/African American, and Two or More. By 2017, the Office of the Chief had male employees in each race/ethnicity category, with increases in males identifying as Hispanic/Latino, Asian, Black/African American, Native Hawai’ian/Pacific Islander, and Two or More, although the number of both male and female American Indian/Alaska Native employees declined.

As noted above, Research and Development lost nearly half of its employees, and this loss is reflected in the loss of female and BIPOC employees, with declines in nearly all race and ethnicity groups, most notably Hispanic/Latino and Black/African American employees. State and Private Forestry added both male and female Native Hawai’ian/Pacific Islander employees and increased the number of male BIPOC employees overall, with increases in nearly every group, most notably Hispanic/Latinos. State and Private Forestry’s female employees remained relatively diverse, but with a small decline in Black/African American employees.

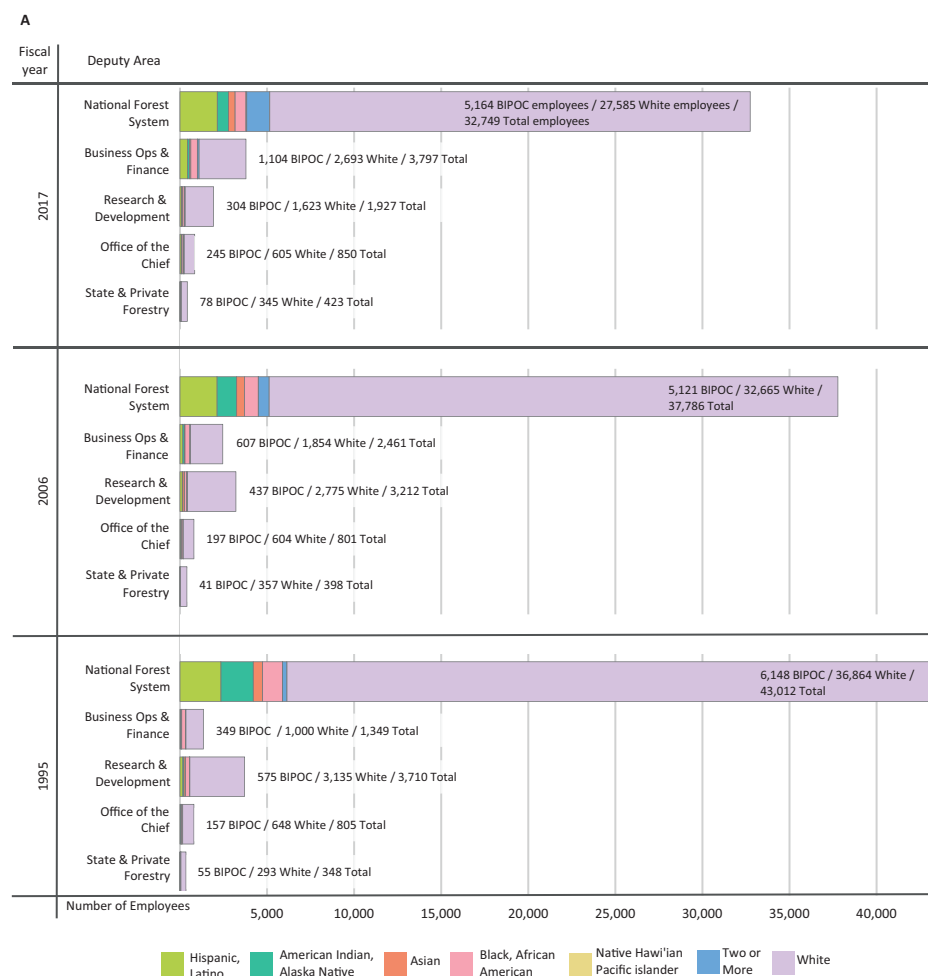
## Discussion

Attaining the goals of a representative workforce—one that through diversity maintains relevance to society—is impossible if an organization does not hire, retain, and advance a diverse workforce. Therefore, looking at the workforce data for change over time is an essential component of achieving diversity-related outcomes; it can point to both what is not working as well as what is. One of the advantages of our dataset is that, unlike publicly available data and previous studies (e.g., Thomas and Mohai 1995), we were able to readily

look at the intersection of race, ethnicity, and gender for all employees across the Forest Service. Gender and race/ethnicity can interact in various ways, affecting lived experience in ways large and small (Crenshaw 1989). Therefore, it is important to look at the data not only by race/ethnicity and gender separately, but to look at the interactions of these variables.

Earlier studies set the stage for ours. Thomas and Mohai (1995) and the *Toward a Multicultural Organization* report (USDA Forest Service 1991) both indicate Forest Service progress in increasing diversity in the 1970s and 1980s, with increases in both female employees and BIPOC employees (both publications only report in the aggregate). Thomas and Mohai (1995) cautioned that female and BIPOC employees were often in lower-graded or administrative positions, and therefore not in the leadership and decision-making ranks, nor were many of these employees in positions likely to lead them to leadership positions over time. This pattern is noted across the federal government through the mid-2000s (Riccucci 2009, Choi 2011). Brown and colleagues (2010a) found an increase in women in higher-grade positions whereas recruitment of women overall was flat, and staff levels were in decline in the 2000s. Brown and colleagues (2010a) also found evidence of group think, such that although leadership may show more demographic diversity, the perspectives of leadership staff were often in close alignment and thereby not able to deliver one of the noted benefits of a diverse workforce: diversity of thought and ideas (Riccucci and Van Ryzin 2017, Batavia et al. 2020).

Our data pick up this story in 1995, looking in-depth at race, ethnicity, and gender composition of the Forest Service workforce. The data show some diversity gains



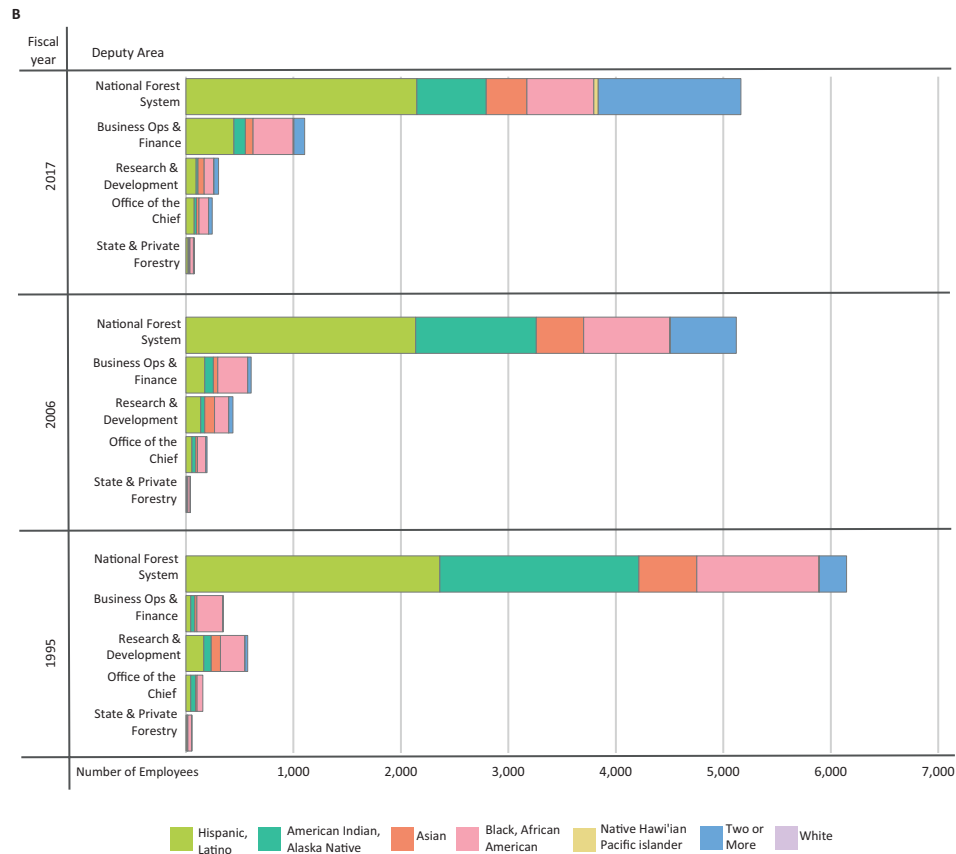
**Figure 10.** a: Forest Service workforce by deputy area and race and ethnicity, including White employees, in fiscal years 1995, 2006, and 2017.

and some losses over 22 years. First, the data show a decline in overall employment at the Forest Service across all demographic groups. Although the percentage of White employees was steadily around 85% of the Forest Service workforce, in terms of numbers, there was a greater decline in White employees overall, reflecting the overall decline in the workforce. This decline may reflect retirements among the older—and Whiter—workforce. Looking at gender, our data show a decline in female employees overall but an increase in female employees in higher grade levels, which indicates a rise in female employees in leadership.

Looking at percentages of the overall workforce across the timeframe of our data, the Forest Service has seen growth in the number of Hispanic employees, especially Latino (male) employees who have grown in both number and percentage of the Forest Service workforce. There has also been an increase in the number of employees who identify as Two or More

and as Native Hawai'ian/Pacific Islander. The Forest Service has held steady in the representation of Black, Latina, and Asian employees (again, as a percentage of the overall workforce), while seeing declines in the percentage of American Indian/Alaska Native employees, both male and female.

Some declines in race/ethnicity categories might reflect changing identities, as when Two or More became a reporting option in 2000. For example, we see a decline in the number of employees identifying as American Indian or Alaska Native, but [Jones and Bullock \(2013\)](#) note those identifying as American Indian/Alaska Native *and* White was one of the four largest groups within Two or More. “African American and some other race” was also one of the primary responses, and so could explain some of the changes seen in numbers of Black/African American Forest Service employees ([Jones and Bullock 2013](#)). The Two or More category is helpful in more accurately capturing how



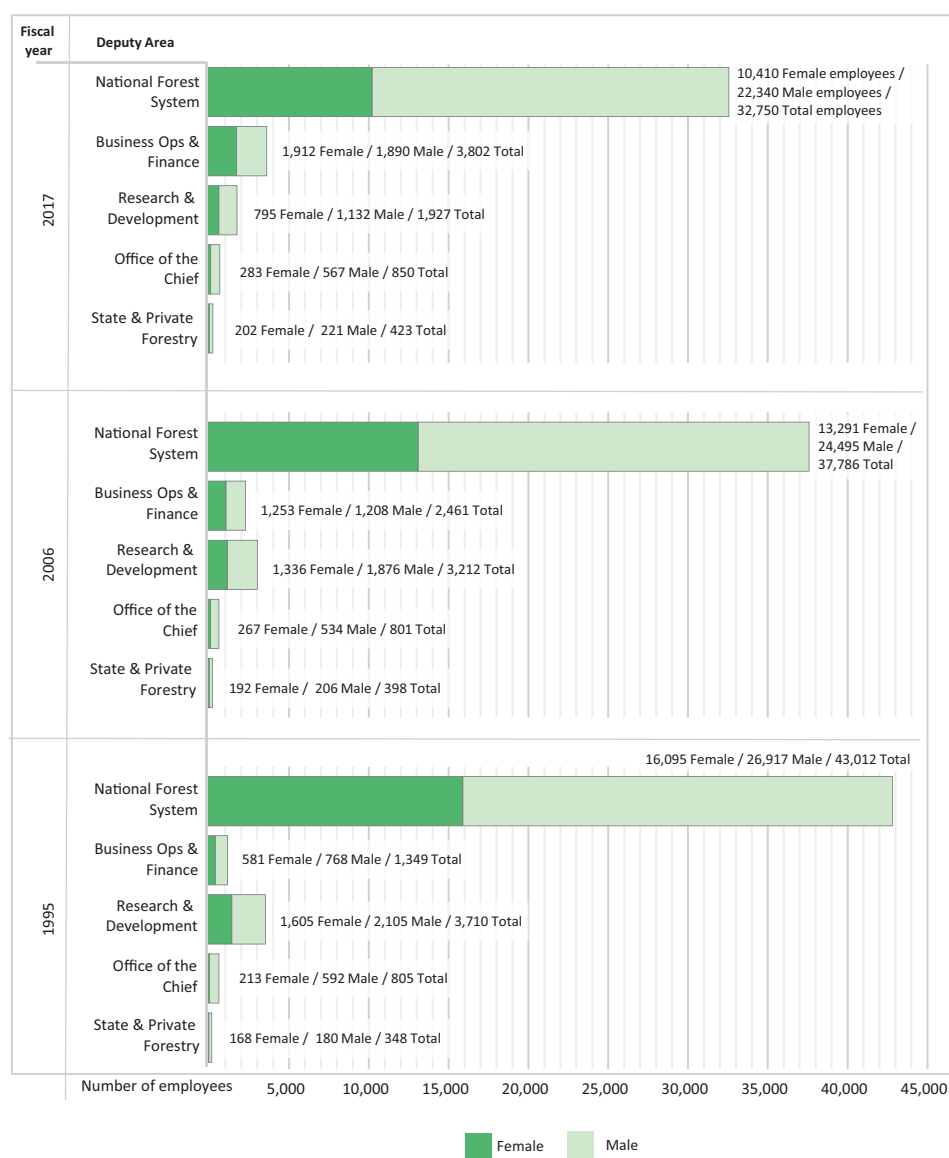
**Figure 10.** Continued. b: Detail of Forest Service workforce by deputy area and race and ethnicity in fiscal years 1995, 2006, and 2017; Hispanic, American Indian/Alaska Native, Asian, Black/African American, Native Hawai'ian/Pacific Islander and Two or More employees. BIPOC: Black, Indigenous, Person of Color.

some individuals identify, but it is also problematic because we have limited data about which racial or ethnic identities people who identify as Two or More hold. This is an area where further research could uncover information useful to managing for diversity in land management organizations, starting perhaps with interviews with people who identify as Two or More to better understand their identities.

Both [Thomas and Mohai \(1995\)](#) and [Fisher \(2010\)](#) found that BIPOC employees and female employees were largely in lower-graded positions. This is one of the most important differences from past trends indicated in our data: the leadership ranks of the Forest Service have become more diverse, with diversity nearly doubling over the 22 years. This is shown in the increase in diversity, both by gender and race/ethnicity, in the upper grade group (GS13-15) and in the Office of the Chief. By 2017, the Office of the Chief had more Hispanic/Latino, Asian, and Black/African American male and female employees; added both male and female employees who identified as Two or More; and had hired male Native Hawai'ian/Pacific Islander

employees. Not only is this a meaningful change within the Forest Service, but it potentially differs from other federal agencies; [Riccucci \(2009\)](#) and [Choi \(2011\)](#) note a consistent lack of diversity at the leadership levels of federal agencies. Note, however, that we did not include the Senior Executive Service (SES), that layer between political appointees and career staff, in our analysis. Office of Personnel Management reports consistently find minimal diversity at the SES level, and the Department of Agriculture (which includes the Forest Service) was among the least diverse SES cadre in 2018 ([U.S. Office of Personnel Management 2020](#)).

When considering deputy areas, there was a substantial rise in the number of Hispanic employees in the Business Operations Deputy Area—not surprising given the location of the centralized business operations offices in Albuquerque, New Mexico, where people who identify as Hispanic make it the city's largest ethnic group ([DataUSA 2021](#)). As discussed above, the Office of the Chief diversified substantially, with not just more BIPOC employees but representatives of each race/ethnicity group employed in that



**Figure 11.** Forest Service workforce by deputy area and gender in fiscal years 1995, 2006, and 2017.

deputy area in 2017. At the same time, however, the National Forest System, the largest deputy area by far, declined in diversity across our timeframe; while there was an increase in male and female employees who identified as Hispanic or Two of More, there were declines in American Indian/Alaska Native, Black/African American, and Asian employees.

Our data show a decline in two branches of the Forest Service: the National Forest System, and Research and Development. The decline in the National Forest System is difficult to interpret using our data. We do not have the detail to determine whether, for example, along with the decline there has been a shift to positions focused on fire instead of day-to-day forest management activities. But the decline in

Research and Development staff is more straightforward to assess. The decline of nearly half in Research and Development could have significant impacts for the future of forestry. Forest Service Research and Development focuses on use-inspired research (Stokes 1997) with both near-term and future application. Although the literature is sometimes contradictory, recent studies have shown the significant impact of public mission-oriented research on the economy as well as the importance—and decline—of federal research funding in the United States in support of basic and mission-oriented research (Atkinson 2019, Foote and Atkinson 2019, Herzer 2020). This trajectory of decline in new knowledge generated by research could have serious repercussions, given the many challenges

**Table 2.** Ratio of female to male employees in each deputy area for 1995 and 2017.

| Deputy area              | 1995<br>(odds of male:<br>1 female) | 2017<br>(odds of male:<br>1 female) |
|--------------------------|-------------------------------------|-------------------------------------|
| National Forest System   | 1.7                                 | 2.1                                 |
| Business Operations      | 1.3                                 | 1.0                                 |
| Research & Development   | 1.3                                 | 1.4                                 |
| Office of the Chief      | 2.8                                 | 2.0                                 |
| State & Private Forestry | 1.1                                 | 1.1                                 |

affecting forests and the services they provide, such as increasing wildfire, invasive pests, pathogens, and climate change (Brodribb et al. 2020, Puettmann 2021).

Comparisons between the federal workforce and the civilian labor force are mandatory, and the Office of Personnel Management routinely produces comparison reports (see [Equal Employment Opportunity Commission 2003](#) and [U.S. Office of Personnel Management 2020](#)). Although these comparisons can offer insight regarding areas of progress and weakness in developing a representative federal workforce (Batavia et al. 2020), others challenge the comparison. For example, Bradbury (2011) argues that the difference in types of jobs in and out of government make comparison to the civilian labor force at best difficult, at worst inaccurate. Nonetheless, the comparison is required and can provide useful lessons.

The comparison to the civilian labor force is, in many ways, not favorable for the Forest Service (Table 1). The Forest Service:

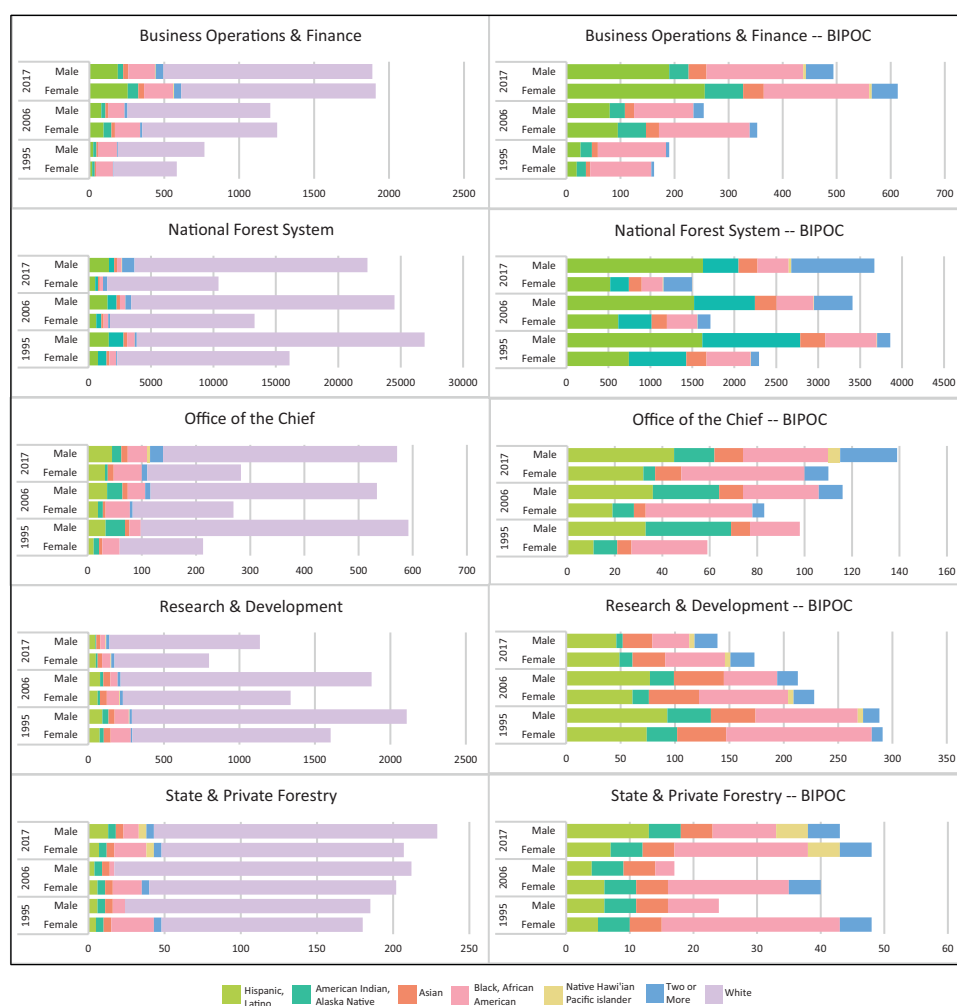
- lost some ground compared with the percentage of female employees in the civilian labor force
- is close to (but not yet matching) the employment of Latinos in the civilian labor force
- has less than half of the civilian labor force representation of Latina employees
- has substantially fewer Black/African American employees, male and female, than the civilian labor force
- has fewer Asian employees, both male and female, than the civilian labor force.

But there are several categories where Forest Service employment surpasses that of the civilian labor force: the American Indian/Alaska Natives, Native Hawai'ian/Pacific Islander and Two or More groups all exceed the civil labor force figures. Higher American Indian/Alaska Native employment with a land management

agency like the Forest Service is not surprising because the Forest Service provides jobs in rural areas, near tribal reservations, often within tribal traditional territories, working for the land and the people who depend on it—all values deeply held among American Indians and Alaska Natives (Kimmerer 2013). There are important benefits from this: Mauer (2017) found that poverty was somewhat less on reservations where more American Indians were employed in natural resource management.

The Forest Service efforts—and struggles—to diversify are not unique. In fact, the need to increase representative diversity across STEM fields is common, as is slow progress (Farr et al. 2017, Cronin et al. 2021, Flory et al. 2021). Within the natural resource management subset of STEM fields, diversity issues are particularly problematic in fisheries (Arismendi and Penaluna 2016) and in soil science (Carter et al. 2021). Mejicano (2020) assessed changes in federal environmental agency workforce by gender and by race ethnicity over time, finding that employment of BIPOC staff grew modestly in most land management agencies (Mejicano 2020). Employment of women also grew at most agencies, with one stark exception: lower grade positions in the Forest Service (Mejicano 2020). Mejicano's analysis echoes our own in showing a growth in women in higher grades and a sharp decline of women in lower grades. This decline in numbers of women in lower-graded positions may be due in part to reduced hiring through the sequestration years, but it still points to a problem in the employment pipeline.

The Forest Service and other agencies are not pursuing diversity for its own sake, but because of the strengths that achieving diversity can provide. Riccucci and Van Ryzin (2017) suggest several important goals supported by achieving a workforce that reflects the diversity of the society it serves: diversity in thought and ideas, increased trust in government, increased compliance with government programs, and increased accountability. Additionally, Batavia and colleagues (2020) assessed four primary arguments in favor of diversity in the natural resource workforce: (1) it is good for the profession, (2) representation of a diverse society in natural resource fields is important, (3) it maintains relevance of the field in a diversifying society, and (4) the availability of new recruits in a diversifying society. Brown and colleagues (2010a) cite Forest Service and other sources that indicate Forest Service alignment with these reasons supporting diversification, with representation emphasized most often. Brown and colleagues phrase some of these topics, such as



**Figure 12.** Forest Service workforce by deputy area and race and ethnicity and gender for fiscal years 1995, 2006, and 2017. Graphs on the right detail Hispanic, American Indian/Alaska Native, Asian, Black/African American, Native Hawai'ian/Pacific Islander and Two or More employee data to allow easier analysis across subgroups and years. Note that the scale of the X-axis is different in each graph. BIPOC: Black, Indigenous, Person of Color.

effectiveness, a bit differently, but their categories cover the same concepts as Batavia and colleagues (Brown et al. 2010a, Batavia et al. 2020).

The Forest Service's motto "caring for the land, serving people" is shared in spirit by many of the other federal land management agencies. The lack of representational diversity in the Forest Service and in other land management agencies (Mejicano 2020) can have negative repercussions for achieving the mission of these agencies. The people served are increasingly diverse, with continued decline in the number of US citizens reporting as White, and a dramatic increase in the number reporting as multiracial (Two or More) (Jones et al. 2021). As discussed above, arguments in support of a diverse workforce include representation, diverse experiences and ideas being brought to bear,

and resulting increased trust in government (Riccucci and Van Ryzen 2017, Batavia et al. 2020).

Brown and colleagues' (2010a) findings offer a cautionary note. They found a decline over time in the differences between male and female Forest Service employees in their attitudes towards forest management and the importance and efficacy of diversifying the workforce (Brown et al. 2010a). In the 1990s, in comparison with male employees, female employees were more likely to favor ecosystem services-oriented management (compared to managing for timber production) and also tended to think a diverse workforce was a more capable workforce. In the 2008 repeat survey, this had changed; employees overall were more equivocal about the effectiveness of diversification efforts. Brown and colleagues also noted a shift in

attitudes among female employees, especially those in leadership roles, towards timber (Brown et al. 2010b). Brown and colleagues hypothesized that some socialization forces are at play, with a steady convergence in viewpoints in the leadership ranks, suggesting that diversity of thought is not making it to the leadership levels, even when diversity by race, ethnicity, and gender is. Therefore, diversity alone may not meet the goals Riccucci and Van Ryzin (2017) and Batavia and colleagues (2020) lay out, a finding that argues for the need to support diversity in perspective and thought within land management organizations along with diversity of demographic characteristics. Without this, meeting the changing land management needs faced by an urbanizing, climate change-affected world will be increasingly difficult. At the same time, if more representative diversity does, indeed, enhance trust and compliance, it could have positive impacts for addressing wildfire (e.g., compliance with evacuation orders or fire safe landscaping) and in achieving ecosystem service benefits from improved green spaces in cities and towns.

The Forest Service has made some gains and had some losses in its efforts to diversify, but numbers of employees only tell part of the story. It is also imperative to understand career paths—who advances and how far? Who departs the Forest Service before retirement, voluntarily or involuntarily? Are some locations or deputy areas better at recruiting and retaining BIPOC and female employees? These and other questions are the focus of our ongoing work. Additionally, analysis of numbers tells us “what,” and some about “who,” but it does not get to “why,” which means that although we were able to get a glimpse of the intersection of race, ethnicity, gender, and types of work done in the Forest Service, these data do not allow increased understanding of the lived experience of Forest Service employees. That, too, could be fruitful for further investigation to help natural resource organizations achieve goals of having a workforce that represents the people it serves.

## Conclusions

Achieving the goals laid out in the Forest Service’s *Toward a Multicultural Organization* (USDA Forest Service 1991) is still a work in progress. Our analysis found some improvements, but some important losses as well. Employment of women in the Forest Service is on the decline overall, although the percentage of female employees in leadership roles has grown

substantially over the timeframe of our analysis. Forest Service leadership ranks also reflect growing racial and ethnic diversity, including increased diversity within female employees in leadership. Combined, this trend in leadership diversity appears to run counter to trends seen in the federal workforce generally. Analysis is confounded somewhat by the growth of the race/ethnicity group Two or More, first offered as a choice in 2000. Overall decline in the number of Forest Service employees further complicates matters. The stagnant and declining numbers in other race and ethnicity categories, especially Black/African American and American Indian/Alaska Native, are cause for reflection and reassessment, whereas the advances made in diversifying leadership is cause for recognition of some progress made. Effectively addressing roadblocks to a representative workforce is critical to ensure public trust in the Forest Service and to continued perceived relevance at a time when forests and forestry are essential to address pressing issues from climate change to social equity (Riccucci and Van Ryzin 2017, Batavia et al. 2020, Puettmann 2021).

## Supplementary Material

Supplementary material is available at *Journal of Forestry* online.

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