

DIVERSITY IN THE NATURAL RESOURCE WORKFORCE

Maria Florentina Mejia and Kerry L. Griffis-Kyle**Department of Natural Resource Management,
Texas Tech University, Lubbock, TX 79409***Corresponding author; Email: kerry.griffis-kyle@ttu.edu*

Abstract.—Resource managers in the natural resource profession address large and complex issues that have expanded as the diversity of stakeholders using these resources has grown. Management decisions impact people’s access to these resources, so including a variety of perspectives in this process is vital for addressing these growing priorities and diverse perspectives. However, the profession fails to represent the human diversity of its constituency. To inform recruitment efforts and retention of diverse groups of professionals, we studied influential experiences, supports and barriers to career development, and timing of career selection. We surveyed 597 students and natural resource professionals in Texas. We found all were drawn to this field because it was intrinsically satisfying; however, females were more intrinsically motivated and males more extrinsically motivated. We also identified differences in influential experiences based on ethnicity suggesting better targeted outreach that addresses cultural differences throughout the formative years is necessary to improve recruitment. The most frequently cited barriers to career progression were the low pay and job security that graduates face when entering the workforce as well as the lack of teacher and mentor support through professional development. The field of natural resources has been improving in workforce diversity but still does not represent the human diversity in the general population. Targeting engaging activities for young children, establishing appropriate mentoring programs, and offering better paying permanent jobs to graduates rather than seasonal employment are ways that the profession could further improve workforce human diversity.

Supplemental material is available for this article online.

Keywords: career motivation, career barriers, workforce diversity, inclusion, students, professionals

Historically, the field of natural resources was narrowly focused on game management. Professionals in this field were mostly white males with backgrounds in hunting and other consumptive uses of these resources (Lopez & Brown 2011; ESA 2006; Colker & Day

Recommended citation:

Mejia, M.F. & K.L. Griffis-Kyle. 2020. Diversity in the natural resource workforce. *Texas J. Sci.* 72: Article 8. https://doi.org/10.32011/txjsoci_72_1_Article8

2004). The discipline has grown in scope especially since the environmental movement in the 1970s to include conservation, ecological health, and environmental outreach which has created opportunities to include more human diversity in its workforce (Chesney 1981; Sharik et al. 2015). However, the discipline still does not reflect the human diversity of the U.S. population (Rodriguez & Peterson 2020).

Progress has been made in hiring, and the field is more diverse than it was historically. Nonetheless, barriers to career progression such as lack of access to opportunities and lack of mentors still exist for marginalized groups (Haynes et al. 2015; Taylor 2017). These barriers hamper the profession's ability to effectively deal with environmental problems because time and mental energy is spent on strategies dealing with barriers rather than solving problems (Lent et al. 2002). By improving representation of diverse groups, we can improve creativity in complex problem-solving, gain a better awareness of environmental justice, and increase support for natural resources programs by connecting with a wider audience (Østergaard et al. 2011; Schelhas 2002; Rice 2011; Taylor 2014). Consequently, the profession and the professional societies that represent natural resources management should have a vested interest in improving diversification of the workforce.

Professional societies in natural resources educate members, increase communication among managers, scientists, industry, and the public; provide training; conduct research; produce policy statements; and increase networking for job seekers. These societies recognize the benefits of human diversity (ESA 2006; Sharik 2015; SRM 2018; Hettlinger et al. 2019) and have set goals to engage and recruit students and new professionals who reflect the demographics and cultures of the public that they serve (Davis et al. 2002; TWS 2016). These inclusive goals have resulted in increased minority and female representation in the profession. For example, the Society for Range Management increased female membership from 13.9 to 20.3% and increased ethnic minority membership from 6% to 8.4% over ten

years (1992 to 2002) (Albrecht 2003). The Ecological Society of America's membership in 2017 was 31% female with ethnic minority representation at just under 10% (ESA 2006; 2017). Even though few natural resource professional societies beyond the aforementioned keep track of these demographic data (J. Blake, The Wildlife Society; V. Trujillo and J. Brown, Society of Range Management: pers. comm.), they have been working to improve human diversity in the profession. These efforts include the creation of society diversity statements, workshops on promoting human diversity, expanding mentoring opportunities for minorities, and holding conference sessions focused on improving ethnic and gender diversity. These activities are designed to engage people and increase applicant diversity of those pursuing careers in natural resources.

Natural resource management decisions influence access to public resources and directly impact the health and well-being of the population (Rodrigues & Peterson 2020). Hence, the profession must include diverse perspectives and priorities from the spectrum of stakeholders to manage the country's natural capital responsibly and ethically (Peterson et al. 2020). If hiring authorities within the profession fail to recruit a diverse workforce, the profession is in jeopardy of failing to address their management responsibilities. Consequently, understanding the process of recruitment and career development in the natural resource profession can provide insights into creating an inclusive professional culture. Social cognitive theory provides a framework for better understanding interactions between personal experiences and career development (Lent et al. 1994; Mau 2000). Insights generated from asking questions structured through social theory can then be used to better recruit and retain a diverse natural resource workforce.

Social Cognitive Theory and the Natural Resource Profession.— Efforts by professional societies, agencies, and other institutions to diversify the field can be refined with a better understanding of the personal factors (interests) and circumstances that influence a person's decision to pursue a career in natural resources. Application of the

social cognitive career theory in research provides a framework for studying and understanding factors that influence career decisions (Lent et al. 1994; Mau 2000). This framework facilitates studying how the interaction among personal attributes, exposure, and experiences lead to progression or lack thereof in career development; for example, when and what experiences have the most influence on how person – situation interactions effect career motivation, and determine the dominant supports and barriers that contribute to career progression.

Career choice is multidimensional and combines personal needs and interests with experiences in and the culture of their workplace (London 1993; Blanchard & Haccoun 2019). “You do it because you love it,” is a common phrase spoken by those in natural resource fields. This love is a result of internal and external stimuli: the intrinsic and extrinsic factors related to motivation (Lent et al. 1994; Haynes et al. 2015). Intrinsic factors are related to activities that are engaging, intangible and pleasurable to the individual, and can result in part from self-efficacy, the belief that the person is capable of doing something. Extrinsic factors are separate from the individual and often related to tangible outcome expectations such as monetary gains or social approval (Lent et al. 1994; Ryan & Deci 2000; Vallerand 2007). Understanding the intrinsic and extrinsic factors related to motivation that enhance career development and commitment can help the discipline attract and retain high-quality employees (Lent et al. 1994; Ng et al. 2017).

A person’s motivation and behavior along with their situational context are integral in their career development. This situational context includes circumstances that help (supports), and circumstances that hinder (barriers) career progression (Lent et al. 2002). The natural resource profession has been making progress in assessing barriers that underrepresented groups have faced entering the profession (Adams & Moreno 1998; Haynes et al. 2015; Balcarczyk et al. 2015), but this knowledge must be better integrated with an understanding of personal aspects of motivation and applied

in recruitment programs to better attract individuals from a variety of backgrounds.

In addition to motivation, the timing of career path selection is important for designing effective recruitment programs and environmental outreach. By identifying appropriate age groups, professionals can devise positive and engaging material to those most receptive to the ideas (Cohen et al. 2004). Previous work focused on middle school (Toepfer 1994), high school (Mortimer et al. 2008), and college experiences (Millsbaugh & Millenbah 2004; Junge et al. 2010); but these studies each focused on a specific age group and did not evaluate across time. Evaluating the timing of this decision, by asking people who have already made this decision, can help those in natural resources target outreach and activities that promote interest in this field as a career.

Our objective was to use the framework of social theory as a guide to ask questions about people's experiences and the influence of these experiences on their career development in natural resources professions. We examined these experiences and their timing in career professionals and undergraduate students to identify factors contributing to career progression or causing barriers to professional development. We assessed variation in experience based on background, career stage, race/ethnicity, and gender. We further identified life experiences influential to different demographic groups and the timing of their natural resources career acquisition. We then used results from this work to provide guidance to help structure recruitment strategies for a diverse workforce in natural resource careers.

MATERIALS & METHODS

To assess factors of motivation, supports, and barriers to natural resource career acquisition, we collected publicly available e-mail addresses in spring 2015 from natural resource websites in the State of

Texas (Mejia 2016), using ApplyTexas (<https://www.applytexas.org/>) to determine natural resources-related degrees. Because universities do not publish undergraduate emails online, we used snowball sampling to broaden recruitment, asking participants to forward study information to others in the field (Ary et al. 2010). Some agencies have rules against using federal email accounts for these sorts of surveys; therefore, we worked with human resources departments to gain internal agency approval.

We used a mixed-methods design to survey students and professionals about how person – situation interactions affected their recruitment and explored similarities and differences in motivation and experiences based on career stage, race/ethnicity, and gender differences. We used multiple choice questions and seven-point Likert-type scales for quantitative assessment and open-ended questions for qualitative explanations (see https://doi.org/10.32011/txjsci_72_1_Article08.S01). We designed our questions to collect information on demographics (multiple choice) (Table 1), factors related to motivation (Likert-type scale: 1 = entirely disagree, 7 = entirely agree), and recruitment experiences (qualitative text) (Chesney 1981; Adams & Moreno 1998; Outley 2008). Questions were modified from published work (Moreno 1994; Amabile et al. 1995; Outley 2008) and evaluated for face validity (does it measure what it is supposed to measure) using expert opinion, and assessed for reliability using a threshold of Cronbach's Alpha > 0.7 for retention (questions are consistent and produce results that do not include random error) (Ary et al. 2010), but not pilot tested. We uploaded questions (Online resource) into Qualtrics (SAP Software Solutions, Newtown Square PA) and distributed links to the survey (see Mejia 2016 for more details including text used). We sent three emails to all individuals to invite their participation at one-week intervals: (1) information about the study, (2) survey link, and (3) final reminder with link. Individuals had three weeks to complete the survey. We used these emails (observed) to assess non-response bias, comparing ethnicities and genders of respondents to screener data on agency

Table 1. Demographic categories used in the survey to examine the motivation of individuals entering natural resource careers in Texas, 2015.

Demographic Category	Definition
Career Stage	
Undergraduate	Undergraduate student in natural resources
Early Career	Natural resource professional, 0-3 years experience
Established professionals	Natural resource professional, 3 + years experience
Ethnicity	
Majority	Identifies as Caucasian/White
Minority	Identifies as other than Caucasian/White
Gender	
Female	Identifies as female
Male	Identifies as male
Other	Does not conform to binary gender categories

demographics (expected) (TPWD 2017) using a chi-square test for non-response bias (Agresti 1990; NISS 2008).

We conducted all quantitative statistical analyses using SPSS 24.0 and 26.0 (IBM Corp. 2016) (*a priori* $\alpha = 0.05$ unless otherwise stated). For these quantitative analyses we excluded surveys in which individuals did not answer questions on intrinsic or extrinsic factors related to motivation or did not provide full demographic information.

We created composite intrinsic scores and composite extrinsic scores by summing scores for Likert-type questions for that factor type (scale of 6-42). We treated composite scores as continuous variables and assessed distributions for test assumptions by examining Q-Q plots of the residuals. We identified two extreme data points from the plots and determined they were greater than 5 absolute deviations from the median (MAD) (median = 34, MAD = 3) and 4.5

standard deviations (*SD*) away from the mean ($\bar{x} = 33.2$, $SD = 4.7$) out of 589 valid questionnaires (Ley et al. 2013). Removal of these points improved model fit so we used parametric statistics excluding the two outliers to assess composite scores (Agresti 1990).

We assessed correlations between the composite scores for intrinsic and extrinsic factors related to motivation using a Pearson correlation coefficient to check for association (Neter et al. 1996). Then we examined how demographics (genders, ethnicities, career stage) affected composite intrinsic and extrinsic scores using Multivariate Analysis of Variance (MANOVA) assessing model fit based on error variances (Levene's test) and residual plots. If the data violated assumptions of equal error variances, we applied a Welch's ANOVA which is robust to variance heterogeneity (Gamage & Weerhandi 1998).

We used nonparametric statistics to test for the importance of experiences (scores 1-7), and the categorical timing of the respondent's decision to pursue natural resources as a career. We first explored differences among demographic groups for the importance of each type of life experience on career decisions by applying an independent samples Kruskal-Wallis test with pairwise comparisons (Kruskal & Wallis 1952). We then examined timing of the individual's decision to pursue natural resources as a career in relation to motivation and demographics using Spearman's rho (Puth et al. 2015).

Last, we qualitatively analyzed the responses to our open-ended questions regardless of survey completion (Bazeley & Jackson 2013). We performed content analysis to familiarize ourselves with the responses by initially reading and tabulating responses, then identifying themes, coding responses, and interpreting these responses in relation to intrinsic and extrinsic factors influencing motivation, and supports and barriers to career development (Hesse-Biber & Leavy 2003). We then further divided these themes into finer-scaled groups of responses, indexing the responses for consistencies using

inductive reasoning and informally comparing interrater reliability. We summarized the data using frequency of response (QSR International 2014).

RESULTS

We contacted 3,982 natural resource college students and professionals in Texas with a 18% response rate. We only considered valid surveys that had more than 60% of the survey completed (Table 2). Respondents included individuals from nonprofits (33 individuals), universities (164) and government agencies including city/county (8), state (259), and federal (105). Valid surveys were mainly from male majority-established professionals, and relatively few student surveys (Table 2) because of difficulty accessing to email addresses due to legal restrictions (U.S. Department of Education 1974). This study sample was comprised of mostly white males and did not reflect Texas demographics (Table 2). We did not use graduate student responses in the analysis (22) as they represent an overlap between student and early career professionals. Of the surveys used for the analysis, minority respondents identified as Hispanic/Latino (36 individuals), African American/Black (15), American Indian/Alaskan Native (7), Asian American/Pacific Islander (10), and other (14). We found no significant difference in gender and race/ethnicity response rates ($P > 0.05$).

Composite intrinsic and extrinsic factors were not correlated (Pearson's $R = -0.05$, $P = 0.3$), demonstrating that gains in motivation caused by one type do not cause losses in the other type. Individuals were more internally motivated ($\bar{x} = 33.2$, $SE = 0.2$; $n = 575$) than externally ($\bar{x} = 19.7$, $SE = 0.2$; $n = 574$). Overall intrinsic motivation was greater in females (MANOVA, $f = 6.9$, $df = 1$, $P = 0.009$), but not related to race/ethnicity or career stage (in all cases $f < 2.5$, $P > 0.1$) (Levene's test for equality of error variances $P = 0.6$) (Fig. 1). Extrinsic motivation was larger in minorities (MANOVA, $f = 8.0$, $df = 1$, $P = 0.005$) and males ($f = 11.0$, $df = 1$, $P = 0.001$), but not

Table 2. Demographic data of respondents (total 597 surveys) who answered questions about the progression of their career in natural resources for surveys that were more than 60% completed, Texas 2015. Texas Census from U.S. Census Bureau (2017).

Demographics	%	Count	Texas Census (%)
Career Stage			
Undergraduate Students	3.1	19	
Early Career Professionals	7.4	45	
Established Professionals	88.1	534	
Did Not Identify	1.6	8	
Ethnicity			
Ethnic Majority	84.8	514	42.0
Ethnic Minority	13.5	82	60.2
Did Not Identify	1.7	10	
Gender			
Female	28.2	171	50.3
Male	71.0	430	49.7
Did Not Identify	0.8	5	
Total	100.0	597	

the interaction ($f = 0.6$, $P = 0.4$) (Levene's test for equality of error variances $P = 0.1$) (Fig. 1). There was no detectable relationship between career stage and extrinsic motivation (Welch's $f_{2, 35.7} = 0.63$, $P = 0.5$, Fig. 1).

Life experiences were important in career development (Kruskal-Wallis $H = 38.0$, $df = 10$, $P < 0.0005$), specifically in the importance of outdoor recreation ($P < 0.0005$) and family activities ($P = 0.01$) (Fig. 2). We examined pairwise differences and found that male minorities established in the profession ranked outdoor recreation less influential than white males at similar stages of their career ($H = 94.5$, $P < 0.0005$). Established male minorities ranked family influences

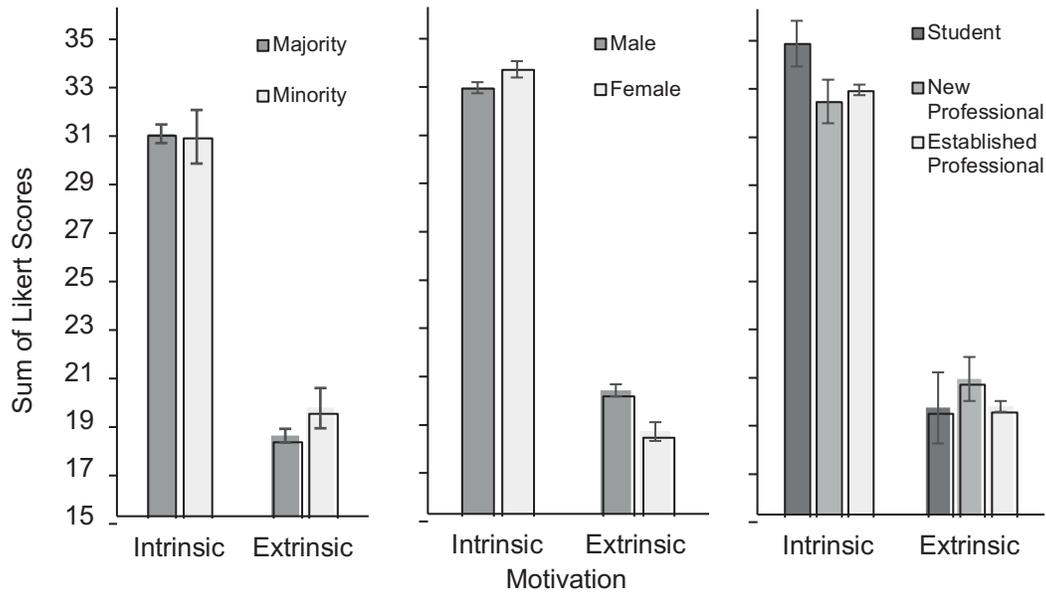


Figure 1. Intrinsic factors related to motivation were greater than extrinsic factors across ethnicities and genders, but did not vary in career stage, likely due to large differences in category sample size (student $n = 19$, new professional = 42, established professional = 517). Internal factors were greater in females than males; external outcomes were greater in males and minorities in the field of natural resources, 2015. Scale 6-42.

less important than white established professionals (in all cases $H = 55.2$, $P < 0.03$). Within white participants, male students tended to rank family as less important than other groups in this category (in all cases $H > 125.3$, $P < 0.06$). There was one early-career minority female, and she ranked outdoor recreation and family as extremely important in influencing her career decisions, which were significantly more important than most other demographic groups (Table 3). However, we caution interpretation as there was only one individual that fit these criteria, so circumstances unique to that person could heavily influence the results. We detected no differences in the importance of environmental media ($P = 0.4$). We also detected no significant differences in the importance of formal and informal science education ($P = 0.08$ in both cases) or youth participation in natural resource management activities ($P = 0.07$) (Table 3).

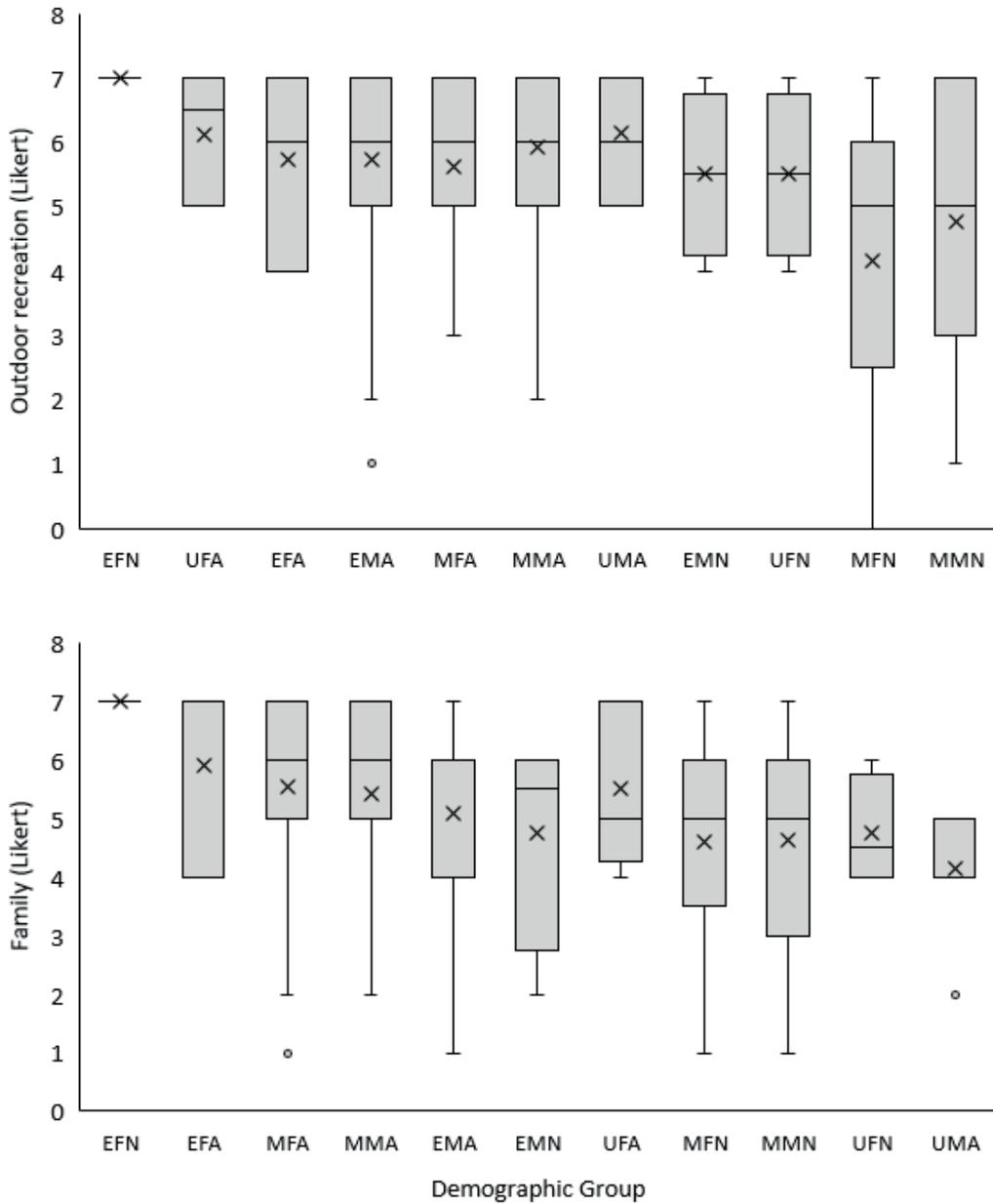


Figure 2. Influence of outdoor recreation (top) and an individual’s family (bottom) on a person’s decision to pursue a career in natural resources showing quartiles, median (x) and mean (bar) response with 7 being a strong influence and 0 no influence, Texas 2015. Note that demographic groups on the horizontal axis are sorted by affect size to better see patterns and do not match between top and bottom graph. The first letter represents career stage (U = student, E = early career, M = established professional), the second letter represents gender (M = male, F = female), and the third letter represents ethnicity (A = majority, N = minority).

Table 3. Median Likert-type scores and ranges reported by demographic groups (career stage, sex/gender, and ethnicity) regarding the importance outdoor recreation, family, formal academic education, informal education, youth participation in natural resources management activities, and environmental media to the development of their careers in natural resources management in Texas 2015. Sample sizes (n) for medians varied based on the number of responses from that demographic group for a specific question.

Demographic (n)	Recr	Family	Forma Ed	Informal Ed	NRM	Media
Student						
Female Majority (8)	6.5 (5-7)	5.0 (4-7)	6.0 (2-7)	5.5 (3-7)	4.0 (1-7)	6.0 (5-7)
Female Minority (4)	5.5 (4-7)	4.5 (4-6)	6.5 (5-7)	5.5 (5-6)	3.0 (1-5)	4.5 (1-7)
Male Majority (7)	6.0 (1-7)	4.0 (1-7)	6.0 (1-7)	5.0 (1-7)	4.0 (1-7)	6.0 (1-7)
Career						
Early Female Majority (11)	6.0 (4-7)	7.0 (4-7)	7.0 (4-7)	6.0 (4-7)	5.0 (1-7)	5.0 (2-7)
Early Female Minority (1)*	7.0	7.0	7.0	7.0	7.0	6.0
Early Male Majority (27)	6.0(1-7)	6.0 (1-7)	6.0 (1-7)	5.0 (1-7)	4.0 (1-7)	5.0 (1-7)
Early Male Minority (4)	5.5 (4-7)	5.5 (2-6)	5.5 (4-6)	5.5 (2-6)	6.0 (2-7)	5.0 (3-6)
Established Female Majority (116)	6.0 (1-7)	6.0 (1-7)	6.0 (1-7)	5.0 (1-7)	4.0 (1-7)	5.0 (1-7)
Established Female Minority (25-26)	5.0 (1-7)	5.0 (1-7)	6.0 (1-7)	5.0 (1-7)	4.0 (1-7)	4.0 (1-7)
Established Male Majority (328-335)	6.0 (1-7)	6.0 (1-7)	6.0 (1-7)	5.0 (1-7)	4.0 (1-7)	5.0 (1-7)
Established Male Minority (43-44)	5.0 (1-7)	5.0 (1-7)	6.0 (1-7)	5.0 (1-7)	4.0 (1-7)	5.0 (1-7)

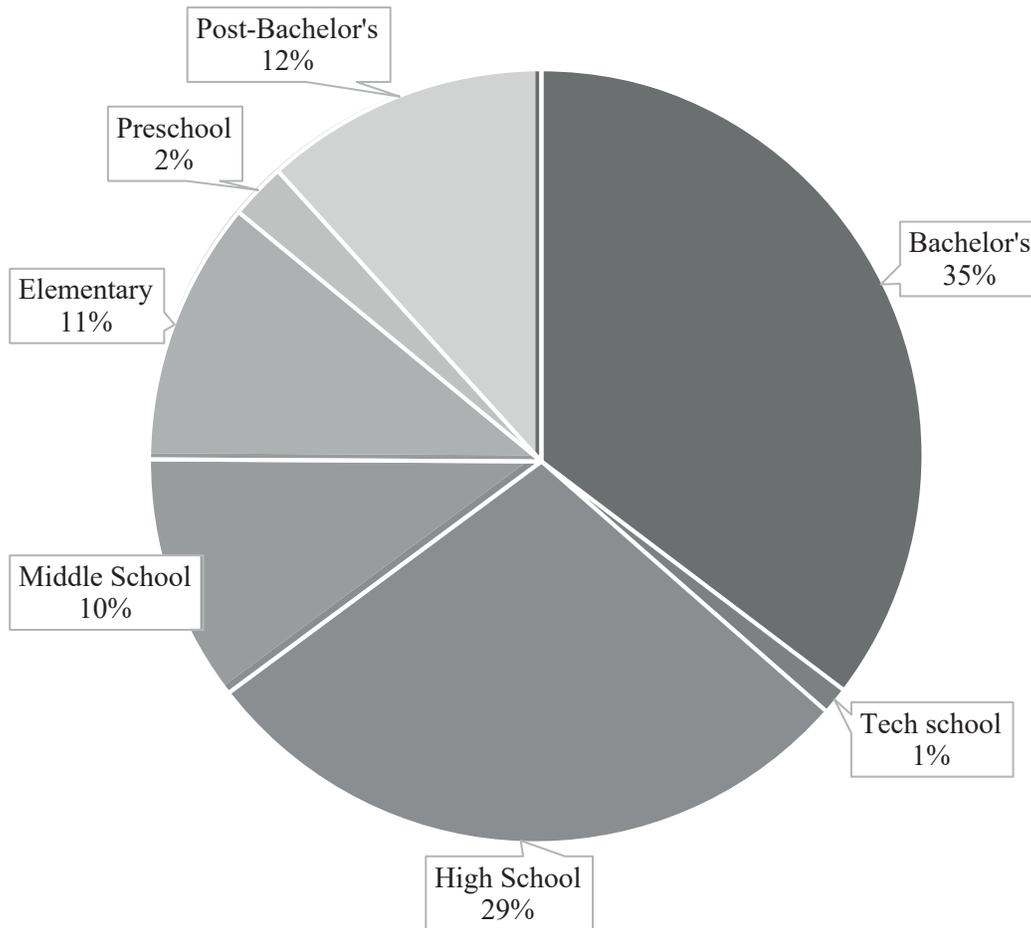


Figure 3. Most individuals indicated that they decided to enter the field of natural resources when they were in college, followed by high school, survey of college students and professionals in natural resources careers in Texas, 2015.

Most respondents chose natural resources as a career after beginning college with fewer individuals deciding earlier in (Fig. 3). There was a small but detectable increase in the importance of extrinsic factors related to motivation in those that chose their career path later in life (Spearman's $\rho = 0.12$, $n = 587$, $P = 0.004$). We found no relationship between demographics and timing of career recruitment (in all cases Spearman's $\rho < 0.04$, $P > 0.3$).

Qualitative analyses of statements provided insight into commonly identified supportive experiences and barriers to career development. We identified eight supportive categories (themes) divided into 23

groups of positive experiences (Table 4). Passion and personal interest were the most common internal factors supporting career development (21%); experiences during school and career were the most common external factors (64%). Next, we identified eleven categories (themes) divided into 26 groups of barriers to career development (Table 5). Individuals described extrinsic deterrents including low pay (18%), lack of educator and administration support and lack of mentors (20%), and lack of job security (11%) as the three top reasons individuals were hesitant to pursue a natural resource career. Note that 11.7% individuals of underrepresented groups including women, ethnic minority females (5.1%), and ethnic minority males (8.1%), indicated narrow-minded professionals and discrimination (i.e. racism and sexism) made them question their pursuit of this career (61.4% of respondents were male ethnic majorities).

DISCUSSION

People want to make a difference in the environment. Our results show this is consistent across study groups: individuals enter the natural resource profession because they are passionate about it and it makes them feel good. These intrinsic factors relating to motivation were therefore the most influential in career selection and development and should be emphasized in recruitment and outreach activities by the profession. Providing activities and opportunities throughout life that increase self-efficacy and make people feel included, invested and empowered can help attract high achievers from diverse backgrounds into the natural resource workforce (Richie et al. 1997; Brown 2000; Armstrong et al. 2007). These types of opportunities ignite and nurture the passions of those considering natural resources as a career from all demographic groups and are an investment in the future of our profession (Duckworth et al. 2007).

Careers in natural resources are personally rewarding, as shown by the relative importance of intrinsic versus extrinsic factors for all responding demographic groups. These careers are rewarding because

Table 4. Qualitative coding and frequencies of categories and groups of survey responses related to positive experiences that attracted individuals to careers in natural resource, Texas 2015 (n=372). Frequency is the number of responses containing that comment.

Category	Group	Frequency
Self-efficacy	Passion and personal interests	77
	Making a difference	39
	Self-motivated	26
	Always knew	5
Outcome Expectation	I can get a career in this!	7
	Job security and benefits	7
Mentor support	Mentorship	60
Educators and administration		102
Career or degree experience	Undergraduate activities	2
	Youth activities	21
	Science	16
	Opportunities	36
	Job activities	106
	Academic classes	58
Organization	Job availability	29
	Positive organizational atmosphere	38
	Education and training	27
Family	Family support	7
	Childhood upbringing	12
	Family heritage	22
	Environmental media	8
	Spirituality	1

Table 5. Qualitative hierarchical coding and frequency of categories and groups of survey responses related to career barriers, Texas 2015 (n=273).

Category	Group	Frequency
Lack of benefits	Low pay	49
	Job security	31
	Working conditions	11
Mentors	Lack of mentorship	21
Educators and administration	Lack of teacher/counselor support	33
	Received poor information about the field	6
	Comparison of this field to others	12
Career/degree experience	Academic classes	24
	Lack of experience	17
Organizational	Politics	23
	Red tape	3
	Academia	14
	Poor hiring practices	19
	Lack of funding	7
	Having to know someone	4
Colleague interactions	Narrow perspectives of professionals/students	30
Discrimination	Sexism	10
	Racism	2
	Lack of diversity	13
Fatalism		10
	Lack of public interest	11
Family	Lack of outreach programs	1
	Lack of family support	3
Other	Family responsibilities	6
	Failed applications	8
	Experienced no recruiting	5
	Frustrating career choice	3

they support an individuals' outcome expectation in their ability to make a positive difference (Weinberg 1995; Richie et al. 1997; Grant 2007; Rueger et al. 2010). Even though all groups found their careers personally rewarding, women were more motivated by these internal factors than men (2.3% greater), and men showed stronger motivation in relation to external factors than women (8.6%). The larger importance of extrinsic factors such as salaries and societal approval in males may be related to gender roles and a male's perceived responsibility as a provider (Bernard 1981; Iorga 2015). Additionally, ethnic minorities reported more motivation from external factors than whites (6.2% greater). In other studies, minority ethnic groups, especially Latinos and Asians, tended to perceive a greater responsibility toward supporting their family (Fuligni et al. 1999; Hardway & Fuligni 2006). Consequently, their career choice may more heavily consider their future ability to support their family (Phinney et al. 2006). Hence, while motivation from intrinsic factors was a strong motivator across groups, extrinsic rewards may be more important for ethnic minority than majority recruitment activities. The inclusion of rewards and recognition such as scholarships and clarity on future outcome expectations (e.g. expected salaries and career opportunities) congruent with family obligations may therefore improve minority recruitment in natural resources careers.

A potential recruitment problem is that access or exposure to opportunities in natural resources may differ as a result of ethnicity (Lent et al. 1994, Lent et al. 2002). While we show similar variation among most groups when they ranked their most influential experiences, minorities established in the profession indicated that outdoor recreation while growing up was not as influential as reported by other groups. Additionally, all minority groups tended to rank outdoor recreation lower than majority groups (except the one response from an early career female minority) (Table 3). This is most likely because opportunities for recreation were not the same between groups possibly because of cultural differences such as the types of leisure activities their family participated in rather than those ethnic groups not caring about outdoor recreation (Balcarczyk et al. 2015; Haynes et al. 2015). Additionally, those activities we asked about

(camping, hunting, birdwatching, fishing, etc.) are not the only ways to engage with the outdoors. We could have missed people that engaged with the outdoors at a local level in urban areas, so broadening our definition of outdoor recreation will be important in getting a more accurate and inclusive assessment of outdoor recreation in the future. Childhood experiences familiarize people with activities that can develop into interests that lead to careers (Lent et al. 1994). A lack of these types of experiences for some demographic groups could contribute to the lack of human diversity in the profession. This result further emphasizes the importance of accessibility and outreach to underrepresented groups in outdoor programs.

Understanding when individuals make career choices in natural resources can help the profession better target outreach and recruitment. We found that most respondents made the decision to enter natural resources in high school or later. Later decisions may occur because students are not aware of natural resources as a career option. During college, students transferring into natural resources often say they did not know about the major or opportunities for careers until well into their undergraduate experience (Washington & Rodney 1986; Griffis-Kyle, unpublished data, Texas Tech University exit interviews). To increase public awareness, experiential programs targeted earlier in primary education should explicitly address career opportunities and outcome expectations in natural resources. This strategy can provide several benefits: activities that improve self-efficacy also improve success in school and career (Stake & Mares 2001; Kinkel & Henke 2006; Armstrong et al. 2007), and early introduction to career possibilities may improve earlier recruitment.

Even though individuals make career choices later, experiences as children influence those choices as shown by the importance of family activities and outdoor activities as children to the people we sampled. Childhood events can improve environmental attitudes and facilitate self-efficacy and intrinsic motivation (Chawla 1999; Powers 2004; Hacking et al. 2007). Our results, demonstrating those choosing earlier were more intrinsically motivated than those choosing later,

support this idea that investing in early childhood experiences can benefit later career recruitment. People want to make a difference and help the natural world (Bowman & Shepard 1985), so encouraging self-efficacy and the belief that they can affect a desirable outcome through hands-on activities is critical for facilitating engagement in the discipline and increasing later recruitment of diverse applicants (Bowman & Shepard 1985; Wildman & Torres 2001; Martinez et al. 2012). These early positive activities that enhance recruitment can also improve later job retention (Lent et al. 2002; Chapman & Guay-Woodford 2008), so outreach activities for children are investments in the future of the profession.

The lack of appropriate supports, such as effective mentors identified by our work, can halt career progression (Lent et al. 1994; Lent et al. 2002; Wells et al. 2005) and cause people to question whether to pursue a career. Quality mentoring relationships, especially those that include shared demographic experiences, are critical for recruiting and retaining individuals because mentors can provide guidance on opportunities, advice on dealing with barriers, and can improve career satisfaction and success (Richie et al. 1997; Campbell et al. 2005; Horner-Devine et al. 2016). Mentors also function as models, helping those earlier in their career visualize their own ability to succeed in the profession. This goal representation, the ability to visualize oneself in a similar job in the future, is an important motivator towards a career path, so targeted mentoring program can be an influential investment in recruitment and retention efforts. The number of these types of programs is growing at professional society meetings, in agency outreach and training, and with community-based programs for the younger generation (e.g. Wells et al. 2005). However, our work suggests there is room for improvement in these mentoring programs, as respondents indicated there was a lack of effective mentors. Other considerations when establishing these programs are the extra responsibilities and time requirements programs can place on individuals from marginalized groups acting as mentors (Jimenez et al. 2019). Consequently, these types of activities should be a part of a normal workload, not activities that are added on

top of an already full-time job or we risk losing gains in diversifying the natural resources workforce.

The natural resources profession may also need to invest in higher paying or more permanent entry-level positions as these were the most common barriers to career development identified by survey respondents. Pay and job security for entry-level bachelor's degree positions in natural resources can be low relative to other professions (Colker & Day 2004; Haynes et al. 2015). These are significant barriers, especially problematic when a person is weighing job satisfaction with the ability to meet family responsibilities (Wildman & Torres 2001; Outley 2008). Cultures that have traditions of strong familial obligations are more likely to look for and require larger salaries even within the natural resources' profession (Taylor 2017). At least some starting salaries are within these salary expectations (Taylor 2008; 2017); however, in some subdisciplines like wildlife biology, highly qualified individuals are competing for entry-level permanent positions, leaving recent graduates at a disadvantage. It is common for recent graduates to work a series of temporary positions before obtaining what is considered an entry-level position in other subdisciplines. To better understand this issue, it is essential to consider the jobs graduates take immediately after college, the time it takes to obtain entry-level permanent positions, and the level of education and experience needed to get these jobs in subdisciplines. Expected outcomes like a competitive salary and job security are crucial when evaluating if a career is feasible for basic needs and family obligations (Maslow 1943; Kenrick et al. 2010). Consequently, the discipline should invest in entry-level positions with job security to make careers in natural resources more attractive and increase human diversity.

There is still little diversity in upper administration of natural resource agencies and in the governing boards of our professional societies, suggesting workplace culture has not changed enough to support a diversity in these senior positions (Taylor 2008; Haynes et al. 2015; Taylor 2014). Our research indicates that workplace culture, specifically racism and sexism are still barriers for ethnic minorities

and women, but not a significant problem for white males. There has been improvement in female representation but less in ethnic diversity, and role congruity still is an issue in upper administration (Eagly & Karau 2002; Taylor 2017). People still experience uncomfortable, discriminatory, and at times hostile work environments (Taylor 2008; Balcarczyk et al. 2015). Close to 12% of our participants from underrepresented groups indicated facing issues of sexism, racism, lack of diversity, or the narrow perspective of their peers as compared to 0.06 % of the majority group. However, our work only includes people still in the field, so we likely underestimate the frequency and severity of these career barriers. Better representation of minorities and women in upper administration are necessary to reduce issues of culture and harassment (Davidson & Black 2001; Bird 2011).

The field of natural resources recognizes the need for workforce diversity. Nevertheless, men made up 70% of our sample, a much larger proportion than the 49.7% in Texas's population where this study took place. Further, the field has been unsuccessful in recruiting and retaining ethnic minorities, as they only make up approximately 17% of environmental organizations (summarized from Taylor 2017 - minority representation in natural resource organizations published since 2010, excluding energy organizations). We see these same patterns in Texas where only 14% of our study participants were ethnic minorities as compared to 60.2% in the state's general population (U.S. Census Bureau 2017). As baby boomers retire, hiring authorities have an opportunity to diversify the professional community and improve connections to and relevancy with the general population (Gropp 2004; Martinez et al. 2012).

If hiring authorities fail to recruit a diverse workforce, the profession is in jeopardy of failing to grasp the varied public perspectives within natural resources. By failing to include these perspectives, the U.S. government is in danger of violating the Public Trust Doctrine – a basis for the “North American Model of Wildlife Conservation” in which the government manages the natural resources in trust for the American public (Geist & Organ 2004; Batcheller et al.

2010; Teel & Mandredo 2010). We suggest using insights from the application of the social cognitive career theory in research to structure outreach, recruitment, and retention programs that integrate socio-cognitive mechanisms such as self-efficacy, outcome expectations and goal representation with context. Using these ideas as a guiding framework, programs can be designed to offer high quality experiences, targeted when those experiences will have the greatest effect, synergistic with programs aimed at removing barriers to career progression (Lent et al. 1994, Lent et al. 2002). These efforts will require designing culturally sensitive outreach and recruitment activities, scaffolding interest starting at a young age to facilitate engagement, and investing in entry level positions to provide appropriate incentives. Some of the contract educators in Texas, such as the East Foundation are great places to begin these outreach activities, especially as they hire educators from culturally diverse backgrounds. We also recommend establishing mentoring networks, in professionals societies and directly in agencies and other groups, to connect those that may have faced similar barriers in ways that do not disproportionately harm mentors in their career (Ragins & Cotton 1991; Dreher & Cox 1996; Balcarczyk et al. 2015). The profession of natural resources is addressing large and complex issues such as climate change and land use change. Engaging diverse cultures and ideas brings together more perspectives and enhances our ability to meet the environmental issues we are facing and is essential for the relevancy of the profession (Manfredo et al. 2017).

ACKNOWLEDGMENTS

We thank Dr. Tom Arsuffi and the Texas Tech University Llano River Field Station in Junction, Texas and all the professionals and students in Texas who took time to complete this survey. We thank the Department of Natural Resources Management and the Rumsey Research and Development Fund for additional financial support for this publication.

LITERATURE CITED

- Adams, C. E. & M. Moreno. 1998. A comparative study of natural resource professionals in minority and majority groups in the Southeastern United States. *Wildl. Society Bull.* 26(4):971-981.
- Agresti, A. 1990. *Categorical data analysis*. John Wiley and Sons. New York. vii+588 pp.
- Albrecht, S. W. 2003. Demographics of the Society for Range Management. *Rangelands* 25:3-6.
- Amabile, T. M., K. G. Hil, B. A. Hennessey & E. M. Tighe. 1995. The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *J. Pers. Soc. Psychol.* 66(5):950-967.
- Armstrong, M. J., A. R. Berkowitz, L. A. Dyer & J. Taylor. 2007. Understanding why underrepresented students pursue ecology careers: a preliminary case study. *Front. Ecol. Environ.* 5(8):415-420.
- Ary, D., L. C. Jacobs & C. Sorensen. 2010. *Introduction to research in education*. 8th Edition. Wadsworth Cengage Learning, Belmont, California, xv+669 pp.
- Balcarczyk, K. L., D. Smaldone, S.W. Selin, C. D. Pierskalla & K. Maumbe. 2015. Barriers and support to entering a natural resource career: Perspectives of culturally diverse recent hires. *J. Forest.* 113:231-239.
- Batcheller, G. R., M. C. Bambery, L. Bies, R. Decker, S. Dyke, D. Guyn, M. McEnroe, M. O'Brien, J. F. Organ, S. J. Riley & G. Roehm. 2010. The public trust doctrine: Implications for wildlife management and conservation in the United States and Canada. *Wildl. Soc. Techn. Rev.* 10-01:1-28.
- Bazeley, P. & K. Jackson. 2013. *Qualitative data analysis with Nvivo*, 2nd Edition. Sage Publications, Los Angeles.
- Bernard, J. 1981. The good-provider role: Its rise and fall. *Am. Psychol.* 36(1):1-12.
- Bird, S. R. 2011. Upsetting universities' incongruous, gendered bureaucratic structures: a case study approach. *Gend. Work Organ.* 18(2):202-230.
- Blanchard, C. & R. R. Haccoun. 2019. Investigating the impact of advisor support on the perceptions of graduate students. *Teach. High. Educ.* DOI: 10.1080/13562517.2019.1632825.
- Bowman, M. L. & C. L. Shepard. 1985. Introducing minorities to natural resource career opportunities. *Ohio J. Sci.* 85(1):29-33.
- Brown, S.V. 2000. The preparation of minorities for academic careers in science and engineering: how well are we doing? Pp. 239-269 in *Access denied: race, ethnicity, and the scientific enterprise* (G. Campbell, R. Denes & C. Morrison, eds.), Oxford University Press, New York, xi+352 pp.
- Campbell, S. P., A. K. Fuller & D. A. G. Patrick. 2005. Looking beyond research in doctoral education. *Front. Ecol. Environ.* 3(3):153-160.
- Chapman, A. B. & L. M. Guay-Woodford. 2008. Nurturing passion in a time of academic climate change: The modern-day challenge of junior faculty development. *Clin. J. Am. Soc. Nephro.* 3(6):1878-1883.
- Chawla, L. 1999. Life paths into effective environmental action. *J. Environ. Ed.* 31(1):15-26.
- Chesney, C. E. 1981. Should racial minorities consider careers in natural resources? *J. Non-White Conc. Person. Guid.* 9(4):146-153.
- Cohen, J. A., M. V. Palumbo, B. Rambur & J. Mongeon. 2004. Middle school students' perceptions of an ideal career and career in nursing. *J. Prof. Nurs.* 20(3):202-210.

- Colker, R. M. & R. D. Day. 2004. Conference summary: Federal natural resources agencies confront an aging workforce and challenges to their futures. *Renew. Resour. J.* 21:6–29.
- Davidson P. & R. Black. 2001. Women in natural resource management: finding a more balanced perspective. *Soc. Nat. Resour.* 14(8):645-656.
- Davis, R. D., S. Diswood, A. Dominguez, R. W. Engel-Wilson, K. Jefferson, A. K. Miles, E. F. Moore, R. Reidinger, S. Ruther, R. Valdez, K. Wilson & M. A. Zablan. 2002. Increasing diversity in our profession. *Wildl. Soc. Bull.* 30(2):628-633.
- Dreher, G. F. & T. H. Cox. 1996. Race, gender, and opportunity: A study of compensation attainment and the establishment of mentoring relationships. *J. Appl. Psychol.* 81(3):97-308.
- Duckworth, A. L., C. Peterson, M. D. Matthews & D. R. Kelly. 2007. Grit: Perseverance and passion for long-term goals. *J. Personal. Soc. Psychol.* 92(6):1087-1101.
- Eagly, A. H. & S. J. Karau. 2002. Role congruity theory of prejudice toward female leaders. *Psychol. Rev.* 109(3):573-598.
- ESA. 2006. Women and Minorities in Ecology II Committee Report. <https://www.esa.org/esa/wp-content/uploads/2012/12/wamieReport2006.pdf>. (Accessed June 6, 2017).
- ESA (Ecological Society of America). 2017. Annual Report to the ESA Council. ESA 102nd Annual Meeting, Portland Oregon, August 5-11. <https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/bes2.1348>. (Accessed July 18, 2018).
- Fuligni, A. J., V. Tseng & M. Lam. 1999. Attitudes toward family obligations among American adolescents with Asian, Latin America, and European backgrounds. *Child Dev.* 70(4):1030-1044.
- Gamage, J. & S. Weerahandi. 1998. Size performance of some tests in one-way ANOVA. *Commun. Stat. – Sim. Comp.* 27 (3):625-640.
- Geist, V. & J. F. Organ. 2004. The public trust foundation of the North American model of wildlife conservation. *Northeast Wildl.* 58:49–56.
- Grant, A. M. 2007. Relational job design and the motivation to make a prosocial difference. *Acad. Manag. Rev.* 32(2):393-417.
- Gropp, R. E. 2004. Developing the federal natural resource workforce. *BioScience* 54(1):16
- Hacking, E. B., R. Barratt & W. Scott. 2007. Engaging children: research issues around participation and environmental learning. *Environ. Educ. Res.* 13(4):529-544.
- Hardway, C. & A. J. Fuligni. 2006. Dimensions of family connectedness among adolescents with Mexican, Chinese, and European backgrounds. *Dev. Psychol.* 42:1246-1258
- Haynes, N., S. K. Jacobson & D. M. Wald. 2015. A life-cycle analysis of minority underrepresentation in natural resource fields. *Wildl. Soc. Bull.* 39(2):228-238.
- Hesse-Biber, S. N. & P. Leavy. 2003. Approaches to qualitative research: A reader on theory and practice. Oxford University Press, New York. vi+545 pp.
- Hettinger, A., A. Kumar, T. Eaves, S. Anderson, B. G. Merkle & S. Bayer. 2019. Extending the vision: highlighting the human dimensions of the Ecological Society of America. *Bull. Ecol. Soc. Am.* 100:e01595.

- Horner-Devine, M. C., J. W. Yen, P. N. Mody-Pan, C. Margherio & S. Forde. 2016. Beyond traditional scientific training: the importance of community and empowerment for women in ecology and evolutionary biology. *Front. Ecol. Evol.* 17: Article 119 DOI: 10.3389/FEVO.2016.00119.
- IBM Corp. 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.
- Iorga, A. M. 2015. Aspects of gender equality within domestic life. *Sci. Pap. Ser.: Manag. Econ. Eng. Agric. Rural Dev.* 15(4):125-130.
- Jimenez, M. F., T. M. Laverty, S. P. Bombaci, K. Wildins, D. E. Bennett & L. Pechar. 2019. Underrepresented faculty play a disproportionate role in advancing diversity and inclusion. *Nat. Ecol. Evol.* 3:1030-1033.
- Junge, B., C. Quinones, J. Kakietek, D. Teodorescu & P. Marsteller. 2010. Promoting undergraduate interest, preparedness, and professional pursuit in the sciences: an outcomes evaluation of the SURE program at Emory University. *CBE Life Sci. Educ.* 9(2):71-140.
- Kenrick, D. T., V. Griskevicius, S. L. Neuberg & M. Schaller. 2010. Renovating the pyramid of needs: contemporary extensions built upon ancient foundations. *Perspect. Psychol. Sci.* 5:292-314.
- Kinkel, D. H. & S. E. Henke. 2006. Impact of undergraduate research on academic performance, educational planning, and career development. *J. Nat. Resour. Life Sci. Educ.* 35(3):194-201.
- Kruskal, W. H. & A. Wallis. 1952. Use of ranks in one-criterion variance analysis. *J. Am. Statist. Assoc.* 47:583-621.
- Lent, R. W., S. D. Brown & G. Hackett. 1994. Toward a unifying social cognitive theory of career and academic interest, choice and performance. *J. Vocat. Behav.* 45(1):79-122.
- Lent, R. W., S. D. Brown, R. Talleyrand, E. B. McPartland, T. Davis, S. B. Chopra, M. S. Alexander, V. Suthakaran & C. Chai. 2002. Career choice barriers, supports, and coping strategies: college students' experiences. *J. Vocat. Behav.* 60(1):61-72.
- Leys, C., C. Ley, O. Klein, P. Bernard & L. Licata. 2013. Detecting outliers: do not use standard deviation around the mean, use absolute deviation around the median. *J. Exper. Soc. Psychol.* 49(4):764-766.
- London, M. 1993. Relationships between career motivation, empowerment and support for career development. *J. Occupa. Organ. Psychol.* 66:55-69.
- Lopez, R. & C. H. Brown. 2011. Why diversity matters. *Wildl. Profess.* 5(2):20-27.
- Manfredo, M. J., T. L. Teel, L. Sullivan & A. M. Dietsch. 2017. Values, trust, and cultural backlash in conservation governance: the case of wildlife management in the United States. *Biol. Cons.* 214:303-311.
- Martinez, E., J. Lindline, M. S. Petronis & M. Pulotti. 2012. Effectiveness of a science agricultural summer experience (SASE) in recruiting students to natural resources management. *J. Sci. Educ. Techn.* 21(6):713-721.
- Maslow, A. H. 1943. A theory of human motivation. *Psychol. Rev.* 50:370-396.
- Mau, W. C. 2000. Cultural differences in career decision-making styles and self-efficacy. *J. Vocat. Behav.* 57(3):365-378.
- Mejia, M. F. 2016. Factors influencing recruitment of natural resource professionals and students in Texas. Unpublished thesis, Texas Tech Univ., Lubbock, 109 pp.
- Millspaugh, J. J. & K. F. Millenbah. 2004. Value and structure of research experiences for undergraduate wildlife students. *Wildl. Soc. Bull.* 32(4):1185-1194.

- Moreno, M. 1994. Factors influencing career interest among majority and minority natural resource professionals in the southeastern United States. Unpublished Thesis. Texas A&M University, College Station, 130 pp.
- Mortimer, J. T., M. Vuolo, J. Staff, S. Wakefield & X. Wanling. 2008. Tracing the timing of 'career' acquisition in a contemporary youth cohort. *Work Occup.* 35(1):44-84.
- Neter, J., M. H. Kutner, C. J. Nachtsheim & W. Wasserman. 1996. *Applied linear statistical models*. 4th ed. Irwin, Inc. Chicago, Illinois. 1408 pp.
- NISS (National Institute of Statistical Sciences). 2008. National Institute of Statistical Sciences task force report: non-response bias analysis. pp 1-23. https://www.niss.org/sites/default/files/research_attachments/ESSIN%20NCES-NISS-TFR-NRBiasAnalysis.pdf (accessed August 31, 2020)
- Østergaard, C. R., B. Timmermans & K. Kristinsson. 2011. Does a different view create something new? The effect of employee diversity on innovation. *Res. Policy* 40(3):500-509.
- Outley, C. W. 2008. Perceptions of agriculture and natural resource careers among minority students in a national organization, Chapter 12. Pp. 139-153 *in* Recreation visitor research: studies of diversity (D. J. Chavez, P. L. Winter & J. D. Absher, eds) Gen. Tech. Rep. PSW-GTR-210. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. Albany, California.
- Peterson, M. J. M. N. Peterson, T. R. Peterson & E Von Essen. 2020. Ethics in wildlife science and conservation. Chapter 27. Pp. 12–38 *in* The wildlife techniques manual: volume 2 management (N. J. Silvy ed.) Johns Hopkins University Press. Baltimore, Maryland, USA. v+614 pp.
- Phinney, J. S., J. Dennis & S. Osorio. 2006. Reasons to attend college among ethnically diverse college students. *Cult. Divers. Ethn. Minor. Psychol.* 12(2):347-366.
- Powers, A. L. 2004. Evaluation of one- and two-day forestry field programs for elementary school children. *Appl. Environ. Educ. Comm.* 3(1):39-46.
- Puth, M. T., M. Neuhauser & G. D. Ruxton. 2015. Effective use of Spearman's and Kendall's correlation coefficients for association between two measured traits. *Anim. Behav.* 102:77-84.
- QSR International. 2014. NVivo qualitative data analysis software (Version 11). QSR International Pty Ltd.
- Ragins, B. R. & J. L. Cotton. 1991. Easier said than done: gender differences in perceived barriers to gaining a mentor. *Acad. Manag.* 34(4):939-951.
- Rice, C. 2011. Scientific (e)quality. *Interdiscip. Sci. Rev.* 36(2):114-124.
- Richie, B. S., R. E. Fassinger, S. G. Linn, J. Johnson, J. Prosser & S. Robinson. 1997. Persistence, connection, and passion: A qualitative study of the career development of highly achieving African American–black and white women. *J. Couns. Psychol.* 44(2):133-148.
- Rodriguez, S. L. & M. N. Peterson. 2020. Human dimensions of wildlife management. Chapter 28. Pp. 39–58 *in* The wildlife techniques manual: volume 2 management (N. J. Silvy ed.) Johns Hopkins University Press. Baltimore, Maryland, USA. v+614 pp.
- Rueger, S. Y., C. K. Malecki & M. K. Demaray. 2010. Relationship between multiple sources of perceived social support and psychological and academic adjustment in early adolescence: Comparisons across gender. *J. Youth Adolesc.* 39:47-61.
- Ryan, R. M. & E. L. Deci. 2000. Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemp. Educ. Psychol.* 25(1):54-67.

- Schelhas, J. 2002. Race, ethnicity, and natural resources in the United States: a review. *Nat. Resour. J.* 42(4):723–763.
- Sharik, T. L. 2015. Diversifying student demographics in forestry and related natural resources disciplines. *J. Forestry* 113(6):579-580.
- Sharik, T. L., R. J. Lilieholm, W. Lindquist & W. W. Richardson. 2015. Undergraduate enrollment in natural resource programs in the United States: trends, drivers, and implications for the future of natural resource professions. *J. Forestry* 113(6):538-551.
- SRM (Society of Range Management). 2018. Diversity and inclusion statement. <http://rangelands.org/about/diversity-and-inclusion/>. (Accessed July 18, 2018).
- Stake, J. E. & K. R. Mares. 2001. Science enrichment programs for gifted high school girls and boys: predictors of program impact on science confidence and motivation. *J. Res. Sci. Teach.* 38(10):1065-1088.
- Taylor, D. E. 2008. Diversity and the environment: myth-making and the status of minorities in the field. *Res. Soc. Probl. Public Policy* 15:89-147.
- Taylor, D. E. 2014. The state of diversity in environmental organizations: mainstream NGOs, foundations and government agencies. Ann Arbor, Michigan, University of Michigan. http://orgs.law.harvard.edu/els/files/2014/02/FullReport_Green2.0_FINAL_ReducedSize.pdf. (Accessed July 24, 2018).
- Taylor, D. E. 2017. Racial and ethnic differences in the students' readiness, identity, perceptions of institutional diversity, and desire to join the environmental workforce. *J. Environ. Stud. Sci.* 8:152-168.
- Teel, T. L. & M. J. Manfredo. 2010. Understanding the diversity of public interests in wildlife conservation. *Conserv. Biol.* 24(1):128-139.
- TPWD (Texas Parks and Wildlife Department). 2017. A strategic plan for Texas Parks and Wildlife Department: natural agenda. Fiscal years 2017-2021. https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_a0900_0622_06_16.pdf (Accessed January 2, 2020).
- TWS (The Wildlife Society). 2016. Workforce diversity within the wildlife profession. http://wildlife.org/wp-content/uploads/2016/04/SP_WorkforceDiversity.pdf. (Accessed August 21, 2017).
- Toepfer, C. F. 1994. Vocational/career/occupational education at the middle level: what is appropriate for young adolescents? *Middle Sch. J.* 25(1):59-65.
- U.S. Census Bureau. 2017. Texas census data: 2017. Population estimates July 1, 2017. <https://www.census.gov/quickfacts/fact/table/tx#qf-headnote-a>. (Accessed July 18, 2018).
- U.S. Department of Education. 1974. Family Education Rights and Privacy Act (FERPA).
- Vallerand, R. J. 2007. A hierarchical model of intrinsic and extrinsic motivation for sport and physical activity. Pp. 255–279, 356–363 *in* Intrinsic motivation and self-determination in exercise and sport (M. S. Hagger & N. L. D. Chatzisarantis eds.). Human Kinetics. Champaign, Illinois, USA. ix+374 pp.
- Washington, W. J. & H. E. Rodney. 1986. How do students learn about natural-resource careers? *J. Forestry* 81(10):22–24.
- Weinberg, M. 1995. Gender differences in student attitudes towards science: a meta-analysis of the literature from 1970 to 1991. *J. Res. Sci. Teach.* 32(4):387–398.

ARTICLE 8: MEJIA & GRIFFIS-KYLE

- Wells, K. M. S., M. R. Ryan, H. Campa & K. A. Smith. 2005. Mentoring guidelines for wildlife professionals. *Wildl. Soc. Bull.* 33(2):565-573.
- Wildman, M. & R. M. Torres. 2001. Factors identified when selecting a major in agriculture. *J. Agric. Educ.* 42(2):46-55.