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## Evaluating the Structure, Demographics, and Effectiveness of the Mississippi Master Naturalist Program

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### Cover Page Footnote

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## Evaluating the Structure, Demographics, and Effectiveness of the Mississippi Master Naturalist Program

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**Abstract.** The purpose of our evaluation was to assess the structure, demographics, and effectiveness of the Mississippi Master Naturalist Program (MMNP) from 2015-2019. Results show that racial diversity within the MMNP was low and offering basic training courses during the work week attracts more retirees. Subsequently, an average retiree completed nearly three times more annual volunteer service hours than a non-retiree. Therefore, targeting retirees may be the most effective means of enhancing environmental stewardship within this program. Additionally, the results of this evaluation highlight that active recruitment of underserved populations is necessary to increase the diversity of participants in Extension programs.

### INTRODUCTION

In Mississippi, the Mississippi Master Naturalist Program (MMNP) is administered through the Mississippi State University Extension Service with support from the Mississippi-Alabama Sea Grant Consortium and the Mississippi Museum of Natural Science. The program's objectives are:

1. To improve public understanding of Mississippi's natural resources and management by developing a pool of local knowledge that can enhance education efforts within local communities,
2. To develop a trained volunteer network, and
3. To expand the educational capabilities of Extension by the dissemination of natural resource management information to Mississippi's communities.

The MMNP was inspired by master naturalist programs in other states, which were born out of a desire to increase science-based environmental education efforts and community service to increasingly urban and suburban populations (Savanick & Blair, 2005). The program model has shown to be effective across the country in providing quality environmental education and producing active environmental stewards and volunteers (Bonneau et al., 2009; Broun et al., 2009; Larese-Casanova, 2011). Since its inception in 2008, members of the MMNP have contributed to environmental stewardship activities across the United States. In 2019 alone, program participants documented 4,716 volunteer service

hours, valued at \$119,928. Participants reached or educated over 22,727 people and directly or indirectly improved 12,266 acres through stewardship activities.

The current model of the MMNP has participants complete a 40-hour basic training course (BTC) to provide an understanding of the region's natural resources and their management. After completion of the BTC, participants are considered certified Mississippi Master Naturalists for one year. To maintain this certification, Master Naturalists must complete 40 hr of environmental stewardship or environmental education-focused volunteer work and 8 hr of advanced training annually. These activities are described in more detail on the MMNP website (<https://masternaturalist.extension.msstate.edu/>).

The MMNP currently consists of a Central Chapter based in Jackson, Mississippi and a Coastal Chapter based in Biloxi, Mississippi. There are two co-state coordinators, based near each chapter, that each dedicate less than 10% of their time to the program.

Since its inception, the MMNP has undergone minimal program evaluation but has used anecdotal data to alter program offerings to attract younger participants and underrepresented demographics. The BTC has been offered both during the day (i.e., during normal working hours) and in the evenings and on weekends (i.e., outside of normal working hours) between the different chapters and during different years; however, no previous master naturalist program evaluation has assessed the effectiveness of varying the BTC

schedule. The purpose of our program evaluation was to evaluate the MMNP using course evaluation and volunteer data collected from 2015-2019. Specific questions include:

1. Does the BTC improve participant understanding of Mississippi's natural resources and their management?
2. From which demographics is the MMNP attracting the most participants?
3. Does altering the BTC schedule (i.e., day vs. evenings and weekends) impact which demographics participate?
4. Are there demographic characteristics that predict a greater commitment to the program as measured in the number of completed volunteer hours?

Formative and summative evaluations of programs like the MMNP provide important information on short and long-term educational outcomes and impacts (Caffarella & Daffron, 2013; Patton, 2008). However, few studies describe the use of evaluation results to guide program improvement (Larese-Casanova, 2015), such as exploring the potential relationships between timing of activities or courses (e.g., day vs. nights and weekends), demographics of participants, and volunteer service hours. Understanding these relationships could have implications for all Extension professionals and associated programming.

## METHODS

For our program evaluation, we focused on MMNP participants who registered for and completed a BTC between June 2015 and June 2019, as both chapters began using standardized methods of collecting participant demographic data in 2015. The BTC was offered during the day (during regular working hours) in 2015 and 2016 by the Coastal Chapter and 2015 and 2017 by the Central Chapter. The BTC was offered in the evenings and on weekends (outside of regular working hours) in 2017 and 2018 by the Coastal Chapter and 2018 and 2019 by the Central Chapter. The Central Chapter did not host a BTC in 2016.

We assessed knowledge gained by administering pre- and post-tests on the first and last days of the BTC. The tests for each chapter varied, as they were designed to test knowledge of each chapter's local natural resources. Participants that only completed either the pre- or post-test were not included in the knowledge gained analysis. We then used a paired t-test to compare pre-test to post-test scores, not differentiating between chapters.

We collected demographic data through both BTC registration forms and an end-of-course evaluation during the last class of the BTC. Collected demographic data included in

our evaluation were retirement status, gender, race/ethnicity, and age.

Participants self-recorded volunteer hours on the MMNP website in four different categories: citizen science, interpretive project, program support, or stewardship project. For each participant, we calculated the average annual volunteer hours for each category and across all categories. We only used volunteer data from participants that completed the BTC between June 2015 and December 2018, because MMNP participants that completed a course in 2019 were not obligated to begin recording volunteer efforts until 2020.

We used contingency tables to identify statistical relationships between categorical variables (i.e., BTC time, gender, race, and retirement status). For continuous variables (i.e., age, retirement status, and volunteer hours), we used either *independent t-tests* for parametric variables or *Wilcoxon Rank Sum tests* for non-parametric variables. All statistical analyses were conducted in *R version 3.6.1* using the *dplyr*, *tidyr*, and *car* packages (Fox & Weisburg, 2019; Team, 2019; Wickham & Henry, 2019; Wickham et al., 2015).

## RESULTS

One hundred and thirty-eight (138) participants registered for and completed at least one BTC between June 2015 and June 2019. Of those 138, 129 completed a demographic survey, and 118 completed both a pre- and post-test. Of the 129 participants that completed a demographic survey, one did not disclose their birth date and two did not disclose their race/ethnicity. One hundred and six (106) of the 138 participants completed the course prior to December 2018 and were included in the analysis of volunteer hours.

### BASIC TRAINING COURSE

Participants showed a significant improvement of 9% between pre-test and post-test scores ( $t = 7.93$ ,  $df = 117$ ,  $p < .05$ ). The average score on the pre-test was 64%, while the average score on the post-test was 73%.

More than half of participants identified as female (56%). Ninety-four percent (94%) of participants identified as White. No participants identified as Hispanic. Participant ages ranged from 22 to 81, with a mean age of 54 ( $\pm 1$  SD of 14). Twenty-nine percent (29%) were retired, while 71% were not (Table 1).

Due to the low number of non-White participants, we did not conduct statistical tests to evaluate the relationship between race and timing of BTC offering. However, there was an association between BTC offering time and both gender and retirement status, with a significantly higher proportion of women and non-retirees participating in the BTC scheduled for evenings and weekends (Table 2). The average age of participants in the day BTCs ( $57 \pm 2$  SE) was significantly

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**Table 1.** Demographic Data of Master Naturalists From 2015 to 2019

| Demographic variable     | Overall frequency | Overall percentage | Day frequency | Day percentage | Evening / Weekend frequency | Evening / Weekend percentage |
|--------------------------|-------------------|--------------------|---------------|----------------|-----------------------------|------------------------------|
| <i>Gender</i>            |                   |                    |               |                |                             |                              |
| Male                     | 57                | 44%                | 31            | 55%            | 26                          | 36%                          |
| Female                   | 72                | 56%                | 25            | 45%            | 47                          | 64%                          |
| <i>Race</i>              |                   |                    |               |                |                             |                              |
| White                    | 119               | 94%                | 52            | 95%            | 67                          | 93%                          |
| African-American         | 5                 | 4%                 | 2             | 4%             | 3                           | 4%                           |
| Asian / Pacific Islander | 1                 | 1%                 | 1             | 1%             | 0                           | 0%                           |
| American Indian/ Alaskan | 1                 | 1%                 | 0             | 0%             | 1                           | 1%                           |
| Other                    | 1                 | 1%                 | 0             | 0%             | 1                           | 1%                           |
| <i>Retirement status</i> |                   |                    |               |                |                             |                              |
| Retiree                  | 39                | 29%                | 24            | 40%            | 15                          | 20%                          |
| Non-retiree              | 97                | 71%                | 36            | 60%            | 61                          | 80%                          |

**Table 2.** Summary Statistics for Participant Demographics in Day Versus Evening/Weekend BTCs

|                          | Test Run                  | Chi-square | T    | Df  | p-value |
|--------------------------|---------------------------|------------|------|-----|---------|
| <b>Gender</b>            | <i>Contingency Table</i>  | 4.72       | —    | 1   | .03     |
| <b>Retirement status</b> | <i>Contingency Table</i>  | 6.26       | —    | 1   | .01     |
| <b>Age</b>               | <i>Independent t-test</i> | —          | 2.35 | 126 | .02     |

higher than the average age of participants in the evening and weekend BTCs ( $51 \pm 2$  SE). The age range of participants in the day BTCs was significantly smaller than the age range in the evening/weekend BTCs (Figure 1).

## VOLUNTEER HOURS

Participants logged the most average annual volunteer hours in the Interpretive Program category, followed by the Citizen Science, Program Support, and Stewardship categories (Figure 2). On average, retirees completed significantly more total and interpretive program volunteer hours than non-retirees (Figure 2). There was also no significant difference in average volunteer hours completed by retirees versus non-retirees for the citizen science, program support, or stewardship categories, nor was there a significant difference between the average number of volunteer hours completed by male and female participants ( $t = -1.08$ ,  $df = 114$ ,  $p$ -value = .28).

## DISCUSSION

The MMNP increased participants' knowledge of local natural resources and their management, therefore achieving the program's first objective. However, the level of knowledge

gained (9%) could be improved. We are currently exploring a standardized curriculum that allows for localized modifications, which has been shown to increase knowledge gained between pre- and post-tests (Chalker-Scott & Tinnemore, 2009). Alternative assessment methods, such as qualitative evaluation of BTC group projects, are also being considered to provide a deeper context of knowledge gained and participant experiences and motivations (Edwards et al., 2019; Merenlender et al., 2016; Patton, 2008).

Currently, 59.1% of Mississippi's citizens are White and 37.8% are Black (U.S. Census Bureau, 2019). However, over 90% of MMNP participants were White while < 4% were Black, suggesting that the altered BTC schedule did not attract underrepresented groups and that strategies to increase diversity and inclusion, like those proposed by Broun et al. (2009), should be developed and implemented for the MMNP. As a first step, conducting a series of focus groups to increase the MMNP program staff and partners' understanding of the local Black community's values and attitudes towards the environment and wildlife could be helpful in adapting the program's objectives for this community (Broun et al., 2009; Teel & Manfredo, 2010). For instance, research suggests the Black community is more drawn to informal or religious volunteering than volunteering for secular orga-

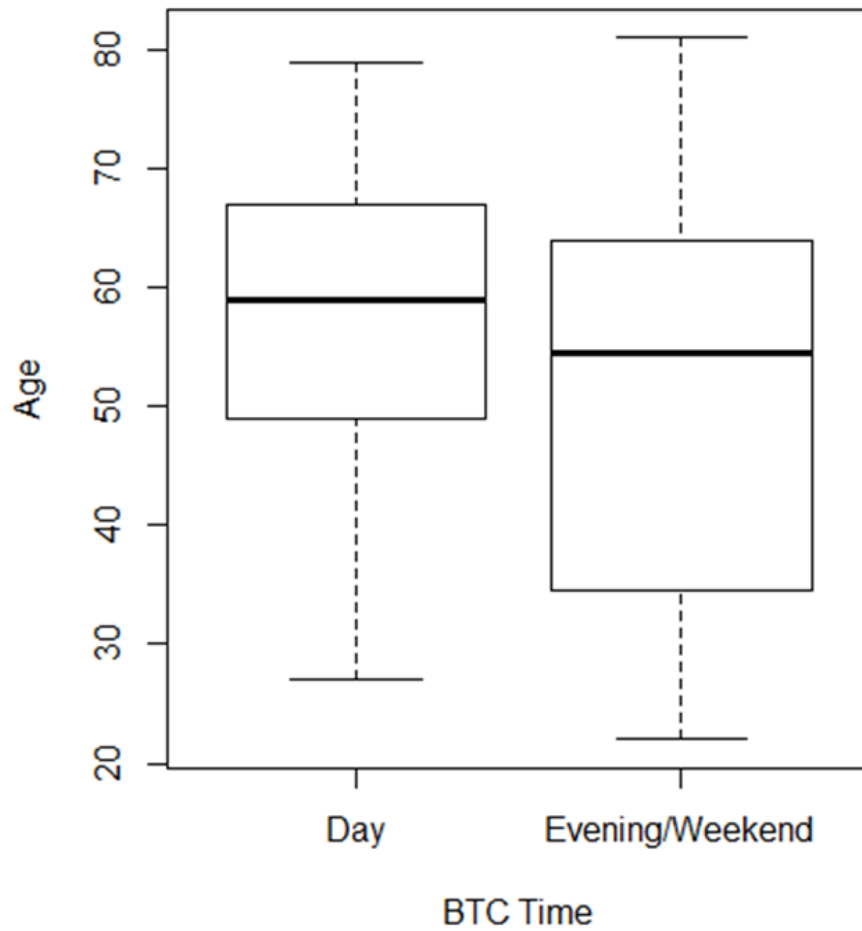


Figure 1. Comparison of age distributions in the day vs. evening/weekend BTCs.

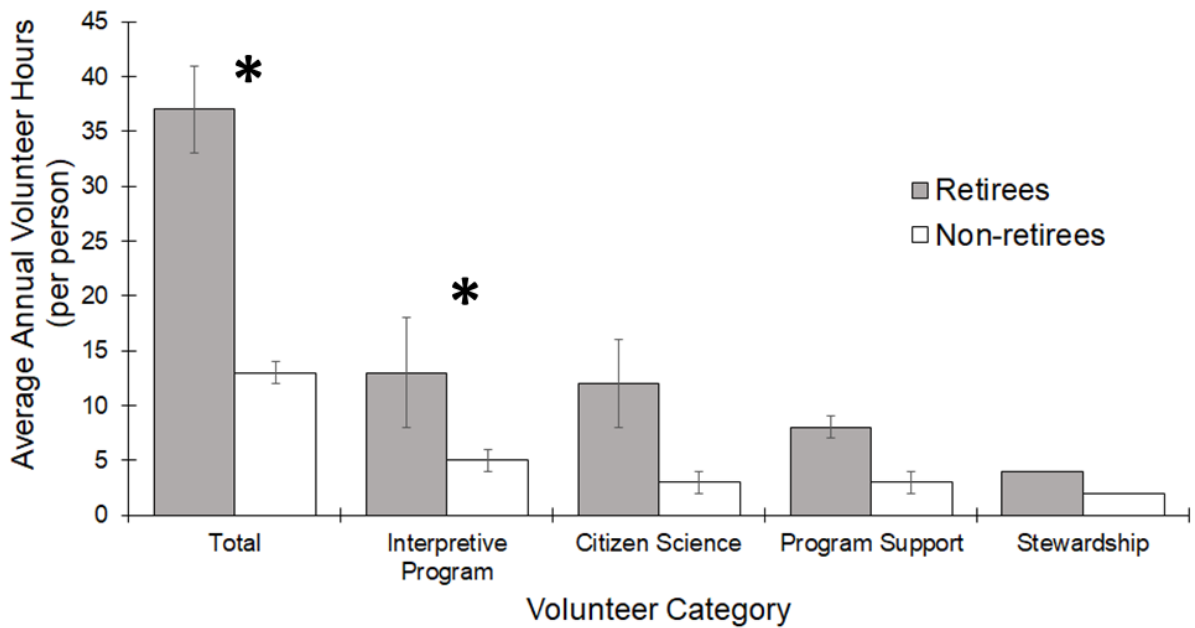


Figure 2. Volunteer Hours Per Category for Retirees and Non-retirees. Asterisks (\*) indicate significant differences between retirees and non-retirees. Error bars indicate  $\pm 1$  SE.

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nizations; therefore, strategies such as engaging with and recruiting from religious organizations may improve the experience and ultimately the participation of this underrepresented community (Broun et al., 2009; Gonzalez et al., 2016; Tang et al., 2012). Other ideas for increasing Black participation include increased targeted advertising for MMNP in underrepresented communities, inviting more Black professionals to be instructors, and providing scholarships to underrepresented communities.

More retirees participated in daytime BTCs, while proportionally more non-retirees and women participated in evening/weekend BTCs. This result is unsurprising as retirees typically have more free time to attend elective activities during the standard work week than non-retirees (Merenlender et al., 2016); however, rationale for why a higher proportion of women attended the evening/weekend BTCs could not be inferred. Retirees engaged in more volunteer hours than non-retirees, which is also likely due to retirees having fewer time constraints than non-retirees. Additionally, women and men provided similar volunteer hours. These results suggest that recruiting retirees over non-retirees may be more beneficial to the MMNP objective of developing an active volunteer network. The MMNP could target this population by offering more BTCs during the day and providing more environmental leadership training, which has been an effective strategy in other environmental programs that target older adults (Culp, 2009; Pillemer et al., 2016).

Interpretive programming, which encompasses activities such as passing out literature at community festivals, conducting programs at libraries, and hosting trail walks at reserves, seems to be the most popular volunteer category among retirees. This is likely due to the relatively high number of opportunities, broad range of topics, and minimal time commitment required compared to the other volunteer categories. The MMNP is currently developing and pursuing more flexible or age-specific volunteer opportunities that may increase volunteer participation across age groups. Examples of these types of activities include web-based citizen science projects and ongoing stewardship projects. As demonstrated in other programs, a volunteer coordinator could help to connect MMNP participants to opportunities in these categories that align with their personal interests and strengths (Culp, 2013).

## CONCLUSIONS

The MMNP has been relatively impactful; however, this impact has been primarily limited to older White retirees. The disproportionately low ratio of underrepresented group participation should be addressed by developing and implementing strategies to enhance diversity and inclusion of these groups and younger participants in the program. The average retiree did contribute more volunteer service hours than the

average non-retiree; however, their service was devoted to predominately less physically strenuous activities. To improve the MMNP, a full-time volunteer coordinator could be hired to develop more salient and targeted volunteer recruitment programs, design non-traditional training events, and tailor volunteer opportunities in an attempt to reduce the common participation barriers such as lack of time and family responsibilities for these groups. The broader implications of this include the continued need to actively engage with and recruit from underrepresented populations and to develop flexible and tailored program activities to increase the diversity and abundance of participants in Extension programs and, subsequently, communities served and program impact.

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