

## Preferences of motorcyclists to views of managed, rural southern United States landscapes

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### ABSTRACT

A survey of motorcyclists was conducted to determine their perception of the quality of views from roads of a managed, rural southern United States landscapes in the winter season. The survey instrument was made available through an advertisement placed in an email newsletter delivered to the members of a motorcyclist organization. While the potential number of respondents was very high, the response rate to the survey was low. We found that respondents generally preferred landscape views with water in the forefront. Landscapes with agricultural land or pasture in the forefront and forest in the background, or that contained mature or young forest in the forefront were preferred to a lesser extent. Landscape views with bare ground in the forefront and forest in the background were the least appealing. However, all types of landscape views, on a scale ranging from very appealing to not appealing at all, at least received neutral mean preference scores from the respondents of the survey.

*Management implications:* The work presented provides a framework for performing a low-cost assessment of landscape aesthetic quality in rural communities specifically for communities that are interested in attracting motorized recreational activities. The population of interests here is motorcyclists but the protocol presented could be applicable to other motorized recreational groups. Municipalities, policy makers, planners, and resource managers interested in attracting this type of tourism need to consider the impacts of scenic driving and motorized recreational activities on infrastructure, natural resources, and road safety.

### 1. Introduction

Outdoor recreation has been found to be beneficial to a person's health and wellness through physical activity, relaxation, and socialization (Rephann, 2013). While motivations for participating in outdoor recreation vary, people often seek out recreational opportunities because they find experiencing nature is relaxing and stress relieving (Whiting, Larson, Green, & Kralowee, 2017). Outdoor recreational activities can include camping, backpacking, cycling, and hiking but can also include motorized recreational activities like driving off-road vehicles (Cordell, 2012), traveling in a recreation vehicle (RV) (Green, 1978), and touring for pleasure on motorcycles (Cordell, 2012; Frash, Blose, Smith, & Scherhag, 2018). Research into motorcyclist's motivations for recreation and their travel preferences is minimal but is a population worth investigating. Motorcycle ridership has increased over time. In 2017, there were approximately 8.7 million registered

motorcyclists in the United States (Federal Highway Administration, 2017) compared to approximately 4.3 million registered motorcyclists in 2000 (Federal Highway Administration 2010). Often, research into motorcycle travel in the United States focuses on rider safety and fatalities (Daniello et al., 2011; Houston & Richardson, 2007; Lee, Pino, & Choi, 2013; McCartt, Blunar, Teoh, & Strouse, 2011; Teoh & Campbell, 2010; Williams & McLaughlin, 2013) or off-road motorcycling activities (Albritton & Stein, 2011; Cordell, 2012).

The National Surface Transportation Safety Center for Excellence (NSTSCE) surveyed motorcyclists across 44 different states in the United States along with a few international riders (Williams & McLaughlin, 2013). The intent of the survey was to understand motorcycle fatalities and to identify some characteristics of motorcycle riders. In general, the majority of the population sampled were male (93%), most often between the ages of 40 and 59 years old (58%), with the average age increasing from 46 in 2009 to 49 in 2019 (Sprung, Chambers, &

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Smith-Pickel, 2018). Way et al. (2011) identified riders above the age of 50 as the largest growing age segment of motorcyclists. This age segment has grown, in part, because they have more free time and disposable income to put toward purchasing a motorcycle and traveling. Typically, motorcyclists rode less than 10,000 miles a year. On average, riders surveyed drove approximately 270 miles per day on days that they rode for pleasure with week-long recreational trips being the norm. Similar findings by McCartt et al. (2011) found motorcycle riding was predominantly a male activity, but Frash et al. (2018) found an increase in women participating in recent years.

Sykes and Kelly (2016) surveyed guests at a motorcycle campground in the northeastern United States. Over half of respondents (54%) indicated that they regularly travel on their motorcycles with no specific end destination. Of the 127 respondents, 52% said that they take overnight trips between 4 and 10 times a year. In planning trips, survey participants felt that attractive scenery on their travel path was important. In addition to enjoying the freedom associated with riding a motorcycle, riders indicated that they chose to ride a motorcycle to spend time in nature and for leisure (Auster, 2001). Walker (2010) found that the focus for many motorcyclists was less about the destination and more about the experience of using a motorcycle to travel. The mode of transportation, the joy associated with riding a motorcycle, was paramount in these recreational trips as opposed to where the trip would end. An online survey sent to people who regularly traveled overnight indicated that in choosing travel routes, appealing landscapes were the most important aspect of their trip (Frash et al., 2018).

Weddell (2014) found motorcyclists preferred to ride on rural roads out of traffic. Further, McCartt et al. (2011) found that the vast majority of motorcycle drivers surveyed indicated that they took trips of 50 miles or longer regularly with the majority of trips occurring on weekends on two-lane roads outside of population centers. Rural areas are attractive for motorcyclists due to a lack of traffic congestion and the presence of rural scenery (Weddell, 2014). When surveyed, motorcyclists said they often take leisure trips to visit tourist attractions that include state and national parks, and historic sites (Sykes & Kelly, 2016) which are commonly found in less densely populated areas. Surveyed motorcyclists spent over \$1,000 (USD) during each trip (Weddell, 2014) while Sykes and Kelly (2016) found riders spent between \$100 and \$200 per day. Additionally, rural counties may also provide recreational opportunities through agritourism. Researchers from the University of Georgia's Department of Agriculture and Environmental Sciences surveyed Georgia residents and found a demand for agritourism which included sightseeing, visiting farms, and fruit and vegetable picking (Doherty, McKissick, & Bergstrom, 2001), all activities that could be enjoyed during a motorcycle trip.

While several surveys of the motorcycling population have been conducted, there has been no effort to quantify what types of landscape features they find appealing. One method of assessing their aesthetic preferences is through landscape assessments using photograph preference rankings. Landscape assessments can be a valuable tool to inform management activities for both recreation and landscape management purposes (Gong, Zhang, & Xu, 2015). Aesthetic value assessments might be used as a surrogate for the visual quality of recreation supply. Further, landscape preferences might have land management implications, as interactions with preferred landscapes might lead to environmental concerns, land degradation, or safety concerns (Whiting et al., 2017). Human perceptions of photographic images of the landscapes have proven to be a legitimate method for facilitating landscape assessments (Arriaza, Cañas-Ortega, Cañas-Madueño, & Ruiz-Aviles, 2004; de la Fuente de Val, Aauri, & de Lucio, 2006; Dramstad, Tveit, Fjellstad, & Fry, 2006; Hammitt, Patterson, & Noe, 1994; Rogge, Nevens, & Gulinck, 2007). Photographic image assessments provide a low-cost alternative to physically transporting respondents to sites for landscape quality preference assessments. Additionally, photos allow for contextual control of landscape characteristics. In this sense, each model (photograph) should contain essential information about the system (the

landscape) while adequately describing influences on the system (Nguyen-Tuong & Peters, 2011) and avoiding nuisance dimensions that may confound the survey (Piquero, MacIntosh, & Hickman, 2000). In essence, those participating in landscape quality assessments should not be distracted by features not always included in the landscape categories of interest (Jacobsen, 2007). Daniel and Meitner (2001) found that photo assessments of a landscape are valid when passive interactions with a landscape, like motorized recreational sightseeing, are occurring. Therefore, for contextual control we carefully attempted to capture photographic images within a single, clear day (controlling potential effects of weather and season), using a consistent perspective (from the side of a road, at a consistent height above ground, without any enhancement), and utilizing consistent viewing depth and contrast in order to best represent the diversity of character of each land class (Arriaza et al., 2004; Shafer & Brush, 1977).

Even though humans may be able to rank the visual quality of landscape, either by viewing the landscape directly or by viewing an image of the landscape, the aesthetic value of a landscape is generally subjective. The aesthetic value of a landscape for an individual observer is a product of observation, interaction, and the past experiences, along with the current characteristics of the landscape (Arnberger & Eder, 2011; Skřivanová & Kalivoda, 2010; van Zanten, Verburg, Koetse, & van Beukering, 2014), and appeal will vary across different populations and within populations. For example, tourists from urban areas will likely have different landscape preferences than those from rural areas (Rambonilaza and Dachary-Bernard 2007). Past research has shown that in rural landscapes the content of the landscape is as influential as the characteristics of the group interacting with the landscape (Schauman, 1988). However, some general assumptions can be made. For instance, an important factor in assessing the aesthetic quality of a landscape is the presence of water (Arriaza et al., 2004; Taylor, Czarnowski, Sexton, & Flick, 1995). Research in the United Kingdom found that, typically, landscapes with water or forests were positively viewed while landscapes dominated by industrial, residential, and transportation uses were not positively viewed (Swanwick, 2009). Water, with forests or plant cover in the background, generally enhances scenic quality (Arriaza et al., 2004; Shafer & Brush, 1977). Kaplan and Kaplan (1989) found that people typically prefer landscapes that they feel are simple to comprehend with a preference toward natural landscape as opposed to agricultural landscapes (Arnberger & Eder, 2011). Naturalness, or the presence of vegetation or water and minimal human impact on the landscape, is often an important predictor of aesthetic value (Herzog, Herbert, Kaplan, & Crooks, 2000; Rogge et al., 2007). Additionally, those landscapes that contain heterogeneous landscape features generally have a greater aesthetic appeal compared to homogenous landscapes (Arriaza et al., 2004; de la Fuente de Vale et al., 2006; Dramstad et al., 2006). It should be stressed that these preferences may vary by observer. For instance, farmers may have a more negative view of landscapes containing dense vegetation, and may find those landscapes dominated by agricultural fields to be more attractive (Rogge et al., 2007). Here, our objective is to quantify observations of aesthetic value through the ranking of photographs by potential observers drawn from a group of motorized recreationists further enhancing the existing, while limited, research on the recreational preferences of motorcyclists. The population includes motorcyclists and the landscape is comprised of heavily parcelized and managed agricultural and forest environments typical of the southern United States. Our main hypothesis is that this group of recreationists demonstrates no significantly different preference for the conditions of the forefront and background scenery that they may encounter along rural, southern roads in the winter season. With the drive being of greater importance than the destination, it is important to understand the landscape preferences of motorcyclists.

## 2. Materials and methods

### 2.1. Site description

Jackson County, Florida is located in the panhandle of the state bordered by Alabama to the north and Georgia to the east. In 2010, the population of the county was estimated to be 49,761 (United States Department of Commerce, 2010). Of the total population, approximately 9,000 lived in the county seat of Marianna. The county encompasses 955 mi<sup>2</sup> of land and is approximately 35 miles from the Gulf of Mexico. The county falls within the Coastal Plain ecoregion and is classified as a humid subtropical climate with an average rainfall of 56 inches and temperatures ranging from 40–44 °F in the winter and 88–92 °F in the summer. On the western boundary of the county lies Lake Seminole at the confluence of the Flint and Chattahoochee rivers. The county is also home to the Florida Caverns State Park containing an extensive system of caves and springs (Florida Department of Environmental Protection, 2019).

Jackson County, Florida was chosen due to the research teams' previous effort in the county. In addition to providing an understanding of people's preferences during motorized recreation, the results from the survey might be used to inform a model of recreational settings suitability previously completed and described in Merry et al. (2018). In that model, landownership parcels and several other spatial datasets were used to identify suitable recreation settings in foreground, background, and remote areas across the county. Specifically, preferences might inform how model inputs could be weighted making the model more robust.

### 2.2. Survey development

A survey was developed to assess which types of landscapes in managed, rural areas of the southern United States were most aesthetically appealing to those participating in motorized recreation using an online survey platform (Survey Monkey, 2019). Following protocols in Dillman (2007), before beginning the survey participants were informed about the purpose of the survey, the estimated time to complete the survey, that their responses would be kept confidential, and were asked if they would like to participate. The survey consisted of a series of photos representing 6 landscape categories (Table 1). Using photos for assessing landscape aesthetics is a commonly used technique (Manning, 2007). Changes in rural landscapes over time were analyzed in Spain using photographs (Gómez-Limón and de Lucío Fernández, 1999), landscape quality preferences were assessed in Germany using landscape visualizations (Häfner et al., 2018), the difference between local residents and non-local residents' preferences toward agricultural landscapes in Norway were identified (Dramstad et al., 2006), and photographs were used to rank landscape characteristics in Spain and Chile (de la Fuente de Val et al., 2006).

Survey participants were asked to rank their preference for visual quality based on a Likert scale. The scale ranged from one to five, with one being "not at all appealing" and five being "very appealing." Photos were captured using a cellphone and were collected by the researcher while traveling throughout Jackson County, Florida. Prior to traveling through the county, the researcher analyzed satellite imagery via Google

**Table 1**

Landscape conditions that generally describe the view of each photographic image.

Category	Landscape Description	photos
1	Agriculture in the forefront, forest in the background	10
3	Bare ground in the forefront, forest in the background	10
3	Mature forest in the forefront	10
4	Pasture in the forefront, forest in the background	9
5	Water in the forefront, forest in the background	10
6	Young forest in the forefront	10

Earth Pro focusing on state roads avoiding cities, subdivisions, and interstates in an attempt to identify where to travel to capture images of the various landscape classes. Potential photo locations were dispersed across the entirety of the county. At specific positions along county and state roads, the researcher stopped their car, and captured an image of the viewable landscape from the road shoulder. A total of 110 natural color photographs were captured by the field researcher with an eye toward including an equal number of photos per landscape class of interest. Photos were removed from the analysis if they were too dark, contained man-made structures including houses or telephone poles. Of the 110 photographs captured, 69 were deemed suitable for use in the survey. With the exception of one landscape class represented by 9 photographs (pasture in the foreground and forest in the background), there were 10 photos included in the survey for each landscape class.

There were several instances where the location of a landscape identified on the imagery prior to travel was not representative of the actual landscape condition. In these instances, when the researcher found an appropriate location representing this landscape class, they stopped and captured an image. A standard sampling protocol, like a stratified random sample by landscape class or randomly distributing sample locations across the county, was not strictly used in selecting locations; however, capturing images when an opportunity presented during travel did introduce a randomness in location selection for image capture.

Photographs were captured during the winter season (January). Therefore, visual quality assessment rankings were not influenced by flowering vegetation. Additionally, an effort was made to ensure that the images were free of man-made structures (e.g., telephone poles, houses, etc.) and animals, specifically for those photos that include pastures and other open areas. This protocol for contextual control (framing the pictures to avoid external influences) was followed to ensure consistency among the photographic images even though external developmental factors (e.g., a cell phone tower in the background) could affect the response of the survey participant. Utilizing standardized methods in this manner may be the single greatest advantage to collecting survey data (Bourque, Shoaf, & Nguyen, 1997).

As suggested by Strumse (1996), five filler slides were inserted at the beginning of the survey and five at the end to avoid start and end effects. These filler images were rated by survey participants but not included in the analysis of preferences. With the exception of the filler photos, the order in which the photos appeared in the online survey was randomized prior to being uploaded into the survey system. Once placed in the survey, the order of the photos was not randomized for each participant. Survey participants were informed that the survey would take approximately 10 min. Additionally, survey participants were required to agree that they wanted to participate in the survey after being notified that their responses would be kept on a secure computer and their responses would be anonymous. Survey protocols were approved by the Institutional Review Board at the University of Georgia.

### 2.3. Survey distribution

In this survey, we targeted motorcycle enthusiasts, which represent a subset of the entire population of people engaging in motorized recreation activities. A link to the survey was delivered to 23,962 potential respondents through an advertisement placed in an emailed newsletter, AMA Extra, facilitated by the American Motorcycle Association. The newsletter, including the link to the survey, was sent to newsletter recipients on September 6, 2017 and again on September 20, 2017. Having multiple instances of contact with potential survey respondents increases the likelihood of participation (Dillman, 2007). Email marketing is an inexpensive and effective method of advertising. Measures of success for email newsletters include the number of successful emails delivered (delivery rate), the frequency with which the email is opened (open rate), and the number of times the receiver clicked on an advertisement in the email newsletter (click throughs) (Hudák, Kianičková, &

Madleňák, 2017). By clicking on the advertisement within an email, recipients were directed to the online survey hosted by Survey Monkey.

Our goal was to gather as many responses as possible from a set of people who participate in motorized recreation and sightseeing activities. Since the survey was Internet-based, the opportunity to distribute a link to a membership group via an internet-based platform (email newsletter) was assumed to increase the likelihood that potential survey respondents would participate and broaden the pool of potential participants. Fortunately, the American Motorcyclists Association was able to facilitate our desire to deliver the survey to motorized recreationists. We recognize that this is a sub-set of the entire population of motorized recreationists, yet the survey represents one of a few that targeted this sub-set of recreationists, and perhaps the first that addressed managed, rural landscapes of the southern United States during the winter season.

#### 2.4. Spatial analysis

Using the spatial location of where each photo was taken incorporated into a geographic information system (GIS), specifically ESRI's ArcGIS 10.5, the distance from the point of origin of the photograph and the distance to the forest line in the background was estimated. The goal was to identify any correlation to the aesthetic ranking and any marked changes in the characteristic of the landscape within the photo (i.e., the transition from pasture in the foreground and forest in the background). No distances were measured for photos of mature forest and young forests because there was no change in landscape characteristic within view. Additionally, changes in topography were not accounted for. This county is located in the panhandle of Florida where topographic changes are minimal.

### 3. Results

The American Motorcycle Association's AMA Extra electronic newsletter containing a hyperlink to our survey was sent to email subscribers on two occasions. First, the newsletter containing the advertisement was sent on September 6, 2017 to 23,978 subscribers. Of those that were sent the email newsletter containing our solicitation for survey participation, 6,248 (26%) opened the email newsletter. Of those that opened the email, 502 interacted with a link within the newsletter. On September 20, 2017 a second email was sent to 23,962 subscribers. The second email was opened by 6,137 (26%) subscribers with 287 interacted with a link within the newsletter. Of those email recipients that interacted with the electronic newsletter (789), 122 newsletter recipients clicked on our advertisement.

Click through rates have been found to be a reliable indicator of an advertisement's success but should not be the sole measure of success (Martin-Santana & Beerli-Palacio, 2011). In total, 130 people participated in the survey either directly through the click-through process or later by simply accessing the Survey Monkey link through a web browser. With a focus on the total number of people that interacted with the electronic newsletter, we had a response rate of 17%. Of the 130 participants that started the survey, 81 completed the entire survey. While we did not collect any personal information about survey participants (name, email address, etc.), we did track ISP addresses and the same ISP address was restricted from participating in the survey more than once.

The photographic images fell into six landscape categories (Table 1). Of the photos presented to survey participants, the number of photos they were asked to evaluate was relatively evenly distributed across landscape class. An average preference score was determined for each photo. Additionally, a correlation coefficient was derived to determine what if any relationship existed between the average aesthetic ranking and the landscape category. In calculating the correlation coefficient, we found no strong relationship ( $r = 0.24$ ) between the landscape category and its average ranking. Approximately 11–17% of respondents identified seven Category 1 (agriculture in the foreground and forest in the

background) photos (Fig. 1) as very appealing. Around 39.0 to 50.0% of respondents designated eight photos as somewhat appealing. Less than 4.0% of all respondents felt that all Category 1 photos were not at all appealing. The majority of respondents found the photos contained in this landscape category as either neutral or somewhat appealing (Fig. 2). This is reflected in the average photo ranking of 3.52 ( $\pm 0.055$ ) and range of average values (3.17–3.64) for this category (Table 2).

For Category 2 photos (bare ground in the foreground and forests in the background) the minimum average ranking was lower than any other landscape category, and the average ranking for the entire set of photos, 2.78 ( $\pm 0.056$ ), was the lowest of any category (Fig. 3). Photo 15 (11.02% of respondents), Photo 16 (11.97% of respondents), Photo 60 (27.91% of respondents), and Photo 64 (20.24% of respondents) had low average rankings. The lowest average ranking for any photo in the survey was 2.24. Category 2 had a large range of average ranking values but it was skewed from neutral to not very appealing. There were two photos (Photo 22 and Photo 49) with only 5.0% of respondents identifying the images as very appealing. The majority of respondents found Category 2 photos to be either neutral or not very appealing (Fig. 4). This category had the highest rate of respondents finding this landscape class to be least appealing, with two photos being assigned a ranking of 1 (not at all appealing) by 20.2% and 27.9% of respondents, as noted above.

The forested landscape (Fig. 5), Category 3, was generally classified as somewhat appealing or very appealing by survey participants (Fig. 6). Between 36.5% and 43.8% of respondents indicated that they found photos in this landscape category to be somewhat appealing. The average ranking for Category 3 images ranged from 3.52 to 4.30 with a mean of 3.92 ( $\pm 0.057$ ). Again, this category had one of the larger ranges of average rankings with images having more than neutral appeal but less than very appealing. There were two instances where forest images were ranked by approximately 43.0% and 44.0% (Photo 8 and Photo 54, respectively) of survey participants as very appealing. In general, very few survey participants felt the forested images were not very appealing with only Photo 44 being ranked as not at all appealing by 4.2% of respondents and all other photos ranked similarly by less than 3.0% of respondents.

Photos with pasture in the foreground and forest in the background (Category 4) (Fig. 7), in general, were considered somewhat appealing or respondents had a neutral reaction to photos in this landscape category with an average ranking of 3.13 ( $\pm 0.062$ ) and range between 2.74 and 3.55. Four out of nine of the photos (Photos 9, 23, 30, and 50) in the category were considered not very appealing by 23.97%, 21.82%, 24.53%, and 32.61%, respectively, of respondents (Fig. 8). All photos in Category 4 were assigned a rank of 3 (neutral) by between 33.9% and



Fig. 1. Example of a Category 1 photo representing agriculture in the foreground and forest in the background.

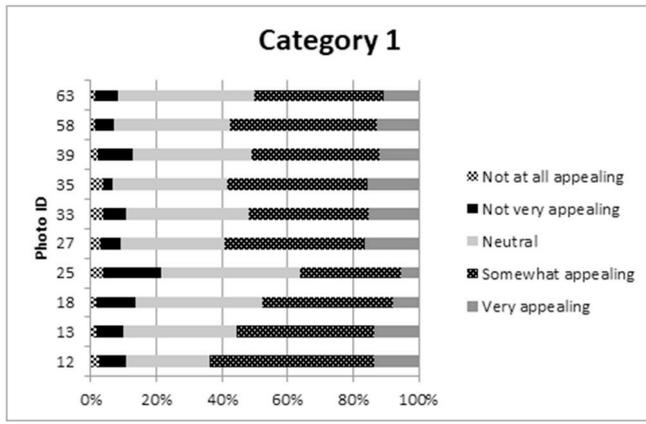


Fig. 2. Category 1 (agriculture in the forefront, forest in the background) percentage of respondents ranking of aesthetic value by photo.

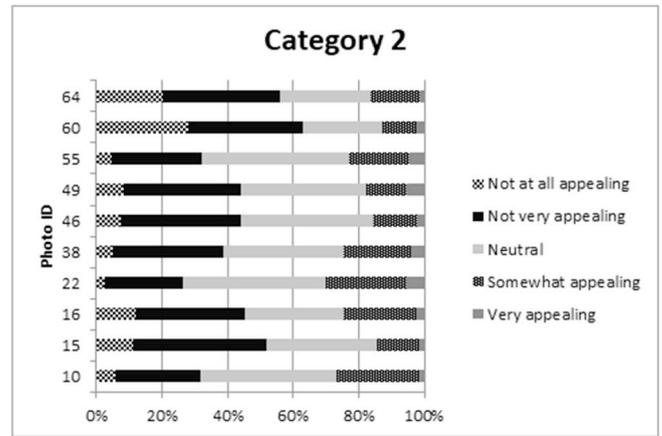


Fig. 4. Category 2 (bare ground in the forefront, forest in the background) percentage of respondents ranking of aesthetic value by photo.

Table 2

Average preference score (range 1–5, with 1=low and 5=high) by landscape category.

Category	Mean	Range	95% confidence interval
1	3.52	3.17–3.64	±.056
2	2.78	2.24–3.06	±.061
3	3.92	3.52–4.30	±.057
4	3.13	2.74–3.55	±.062
5	4.22	4.10–4.37	±.047
6	3.23	2.98–3.86	±.063



Fig. 5. Example of a Category 3 photo representing a forested landscape.



Fig. 3. Lowest ranked photo in the survey, with agriculture in the forefront, and forest in the background.

46.2% of respondents. The majority of Category 4 photos were ranked as somewhat appealing by between 20 and 43% of respondents. Only two photos (Photo 28 and 52) were considered very appealing by 10.38% and 11.24%, respectively, of the surveyed population.

One-third of Category 5 (water in the forefront, forest in the background) photos, Photos 26, 53, 59, and 61, were considered very appealing by 43.93%, 41.57%, 47.67%, and 42.86%, respectively, of survey participants (Fig. 9). Nine out of 10 photos in the category were identified as somewhat appealing by between 42.1% and 58.8% of respondents. On average, respondents gave Category 5 photos a ranking of 4.22 (±.047) with a range of between 4.10 and 4.37. In general, photos

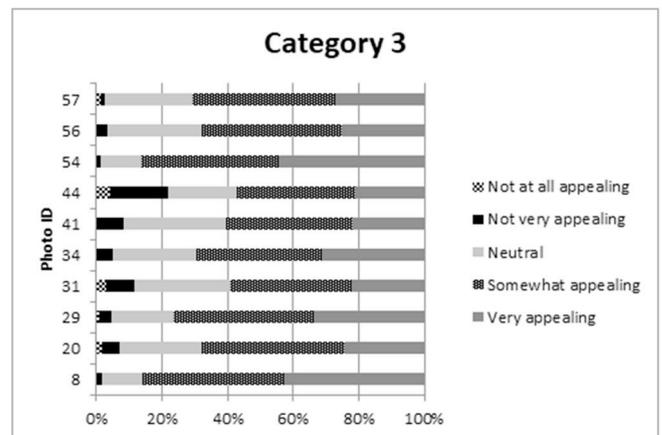


Fig. 6. Category 3 (mature forest in the forefront) percentage of respondents ranking of aesthetic value by photo.

with water in the forefront and forest in the background had the highest aesthetic appeal of all landscape categories. The highest ranked photo assessed by survey participants, Photo 59, was found in this category (Fig. 10). Consistently, Category 5 photos had the highest aesthetic appeal of all 6 landscape categories. There were two instances, Photos 6



Fig. 7. Example of a Category 4 photo representing pasture in the foreground and forest in the background.



Fig. 10. Highest ranked photo in the survey, with water in the foreground, forest in the background.

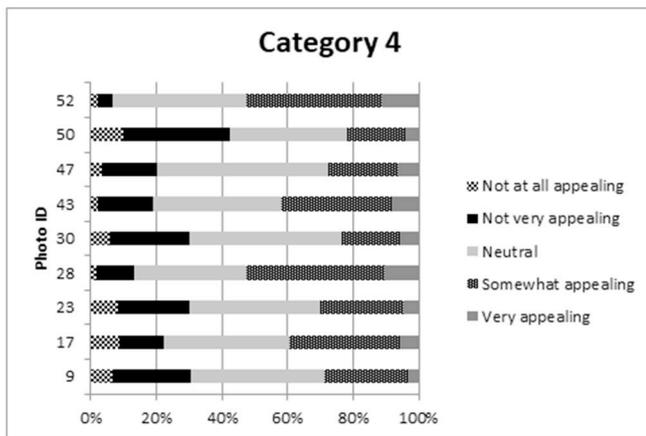


Fig. 8. Category 4 (pasture in the foreground, forest in the background) percentage of respondents ranking of aesthetic value by photo.



Fig. 11. Example of a Category 6 photo representing a young pine forest.

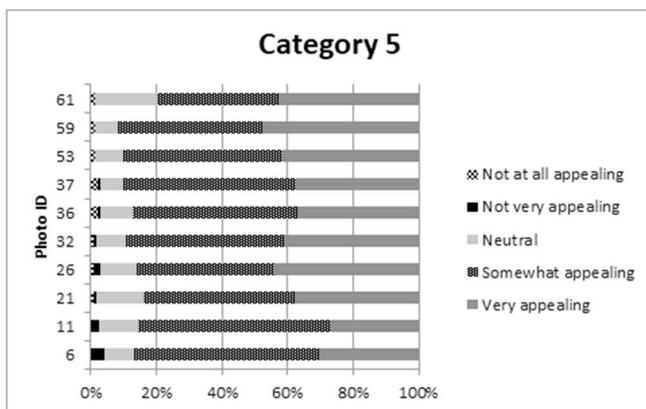


Fig. 9. Category 5 (water in the foreground, forest in the background) percentage of respondents ranking of aesthetic value by photo.

and 11, where no survey participants found the photos to be not at all appealing. The remaining photos in this category were ranked by less than 2% of respondents as not at all appealing.

Young pine forests (Fig. 11), Category 6, had the largest range in average ranking values. Four photos in this category, Photos 14, 48, 51,

and 62, were ranked as not very appealing by 21.19%, 28.42%, 34.44%, and 26.19%, respectively, of respondents. Between 26.45% and 42.11% of respondents ranked all young pine photos as having neutral appeal (Fig. 12). Similarly, between 21.11% and 41.32% of respondents felt that Category 6 photos were somewhat appealing. Only one young pine

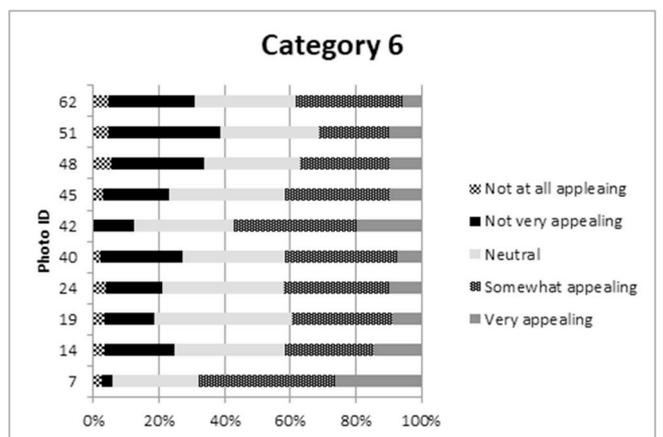


Fig. 12. Category 6 (young forest in the foreground) percentage of respondents ranking of aesthetic value by photo.

forest photo, Photo 7, was identified as very appealing by 26.45% of respondents. All other photos were ranked as very appealing to less than 20% of respondents. The average rankings for Category 6 photos ranged from 2.98 to 3.86 with an overall average ranking of 3.23 ( $\pm 0.063$ ). Generally speaking, participants felt that young pine forest had a neutral appeal.

Using Pearson's correlation coefficient ( $r$ ), a statistical analysis determined that there was no clear correlation between the distance to landscape transition and the average ranking for the four landscape categories (as a whole group) where a distance could be measured which included Categories 1, 2, 4, and 5. Pearson's correlation coefficient is expressed based using a value between 1 indicating a positive correlation, 0 indicating no correlation, and -1 indicating a negative correlation and measures the association between two variables. However, a negative correlation was observed between distance to landscape transition and average ranking of aesthetic value for Category 1 photos ( $r = -0.10$ ). Both Category 2 and Category 4 photos had a more pronounced negative correlation ( $r = -0.65$  and  $r = -0.71$ , respectively) between the distance to a landscape transition (bare ground to forest and pasture to forest, respectively) and their average ranking of aesthetic value. This suggests that as the distance to the forested background increased, the preference for the landscape view (bare ground and pasture in the foreground) decreased. However, Category 5 (water in the foreground, forest in the background) had a positive correlation ( $r = 0.62$ ) suggesting that as the distance to the forest background increased landscape view preference increased.

#### 4. Discussion

The outcomes of our observational study suggest that motorcyclists may place higher aesthetic value on landscapes that include water in the foreground and forest in the background. Secondly, they seem to also prefer mature, forested landscapes in the foreground. Other types of scenery in a managed, southern United States landscape (agriculture or pasture in the foreground, forest in the background; young forest in the foreground) were deemed neutral, while views with bare ground in the foreground were least appealing. The results of this exploratory study should be placed in context of the dynamic nature of land management in the southern United States. Agricultural fields will likely be considered bare ground for a short period of each year depending on the crop that is grown, while young forests may transition to mature forests after 20 years or more. Similarly, the bare ground images used in this study may only be temporary, as they transition to some sort of crop. These results of this study should also be placed in context of the time of year of the study. The survey was conducted in the winter season. In the southern United States, the water and pastoral landscapes may look similar in both winter and summer season, yet the agricultural fields will likely look different as might the forested landscapes where deciduous trees are present.

As reported by the American Motorcycle Association's marketing team, 122 newsletter recipients clicked on our advertisement and 130 people participated in the survey. This survey response rate is obviously low. While we cannot explain why potential responders decided not to participate in the survey, we can provide some insight into what may have affected participation. Firstly, access to the survey was primarily afforded to potential participants through clicking on an advertisement embedded in an emailed newsletter sent out to subscribers. Fan and Yan (2010) found that surveys supported by government entities or academic institutions frequently have higher response rates compared to surveys distributed by a commercial organization. While the advertisement included branded graphics indicating that the survey was sponsored by an academic institution (The Warnell School of Forestry and Natural Resources, University of Georgia), the indirect contact from the survey purveyors and potential respondents may have decreased participation. Suggested means for increasing survey participation include sending reminders to potential survey participants with a link to

the survey (Fan & Yan, 2010; Kaplowitz, Hadlock, & Levine, 2004; Nulty, 2008) or incentivizing survey participants (Nulty, 2008). We pursued neither of these two courses of action in this study. The newsletter containing the advertisement was sent twice to subscribers, two weeks apart, within the month-long period that the survey was open. A follow-up email reminder containing a link to the survey from a university faculty or staff member may have lent the survey more stature leading potential respondents to participate (Fan & Yan, 2010; Nulty, 2008) and provided some indication of whether the sample accurately reflected our population of interest. We did not have access to a database of subscribers to the American Motorcycle Association email newsletter, so we were unable to send reminders to potential survey participants.

Additionally, the hyperlink to the survey may have reached newsletter subscribers that are not internet savvy or did not often access email or the internet. While 79% of the population of the United States under the age of 45 use the internet, internet usage decreases slightly with the 45 to 65 age cohort (76%), and more dramatically (52%) when considering those older than 65 (Hargittai & Dobransky, 2017). If the demographics of the survey population were skewed to older aged persons, then there may have been reduced internet usage across the population. Further, those subscribers that received the email newsletter may have simply overlooked the advertisement soliciting their participation (Martín-Santana & Beerli-Palacio, 2011). Recipients may view the internet as having limited usefulness outside of occasional shopping, social media activities, and entertainment as opposed to helping a research effort (Silva & Durante, 2014) rendering the advertisement unappealing. Additionally, potential respondents may not have understood how their responses might impact their recreation experiences. Considering the unrestricted access to the survey (the survey was sent to newsletter subscribers but the link was not restricted and could have been shared with others that were not subscribers), it is difficult to firmly identify reasons for a low response rate or nonresponse bias (Couper, 2000).

The results of this survey could be used to inform and improve models of recreation supply. In Merry et al. (2018), the analysis sought to identify recreation opportunity by zones (foreground, background, and remote areas) based on their distance from roadways across public and privately owned land parcels. Specifically, aesthetic preferences derived from the survey presented here could be used to identify those landscape categories with a high scenic value in the foreground, background, or remote areas across a managed southern United States landscape. However, the response rate may likely not be high enough to be considered reasonable for model input. The high level of non-respondents raised concerns that those who did respond were not completely representative of the population as a whole. Instead, the results of the survey may be most useful as an observational study on identifying potentially aesthetically appealing landscapes in rural areas. Future research might involve soliciting participation of other motorized vehicle organizations, including automobile clubs and recreational vehicle groups, and comparing the results across the different sub-populations of the motorized recreation group. Further, the results of this research could be utilized by counties eager to promote tourism, specifically scenic driving, allowing them to conduct their own low-cost assessment of the aesthetic quality of their landscapes. Scenic driving opportunities markedly increase riders interest in visiting an area. As has been noted, this is a population with economic means making them an attractive population to bolster the economies of rural areas through tourism opportunities. These groups prefer quality roads with little traffic that may be available in rural regions. Promoting scenic drives to branded motorcycle groups (e.g., BMW Motorcycle Owners of America) or through touring groups (e.g., American Motorcycle Association) may be effective methods for attracting motorcyclist to rural areas. Similarly, local stakeholders working with such groups would be imperative in promoting tourism opportunities for motorcyclists (Sykes & Kelly, 2016). Finally, in encouraging motorcycle recreation in rural areas, local stakeholders will need to understand the management implications of

such recreation including road safety, natural resource impacts, and infrastructure quality. Surveys like the one presented here are useful in identifying where management and planning activities would be required.

## 5. Conclusion

This study represents one of the first assessments of landscape preferences by motorized recreationists of managed southern United States landscapes, rural areas containing a high density of roads and agricultural and forest land use activities. Further, the study represents one of a very few surveys of motorcycle enthusiasts, an important sector of the motorized recreationist population. The study is also unique in its focus on managed landscapes in the southern United States during the winter months. We conclude from these observations that viewscape containing water in the forefront are more aesthetically appealing than all other types of viewable landscapes. When water bodies were not present in the forefront of a view, mature forest landscapes in the forefront were preferred over those that included bare ground, pasture, or agricultural fields in the forefront, regardless of the presence of forest in the background. However, these other important aspects of the managed landscape of the southern United States were not considered unappealing, for example bare ground in the forefront received a neutral mean preference score from the respondents of the survey.

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