2009 Recreational Storm Chaser Study Report

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Cloud 9 Tours

F5! Tornado Chasing Safaris

H1-Intercept

Ron Gravelle Storm Chasing Tours

Weather Gods

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EXECUTIVE SUMMARY

Storm chasing has increased in popularity during the past decade; however, little research exists on the characteristics of these tour participants. Hence, in partnership with five storm chasing tour agencies, the Department of Parks, Recreation and Tourism at University of Missouri conducted a study to examine the characteristics of recreational storm chasers and their tour experiences. This study also explored the decision making process of recreational storm chasers, future engagement in storm chasing, and perceptions of operational tour attributes.

The most typical recreational storm chasers were White, male, over 35 years old, and lived in the United States. Most frequently they were single, without children, full-time employed, had a college degree, and with an annual household income of at least $50,000. Responding recreational storm chasers learned about the tour operator from an internet search and decided to take their tour at least one year in advance. About half of them took the tour alone. Many respondents had no previous storm chasing experience, and considered themselves unknowledgeable about storm chasing. Enjoying nature, learning, and stimulation were the top three motivations to engage in recreational storm chasing. Responding recreational storm chasers also enjoyed seeking new experiences, such as exploring new places, and they liked to have unconventional exciting experiences.

Recreational storm chasers were very satisfied with their tour agency and their expedition. Most would take another storm chasing tour with the same company and also would recommend both storm chasing and their tour agency to others. Respondents also indicated that they would be willing to spend more time and more money on storm chasing in future. Overall, respondents ranked highly the business components of their tours, and in particular, attributes related to tour operators and staff. Results indicated that giving some attention to the tour package could increase these already high customer satisfaction levels.

INTRODUCTION

Storm chasing has become an increasingly popular recreation activity, particularly since the release of the movie Twister in 1996. However, very little scientific information exists on this recreation activity and recreational storm chasers. Therefore, to better understand this recreation activity, the University of Missouri Department of Parks, Recreation and Tourism conducted a study in partnership with five storm chasing tour agencies operating throughout the United States: Cloud 9 Tours, F5! Tornado Chasing Safaris, H1-Intercept, Ron Gravelle Storm Chasing Tours, and Weather Gods. This report summarizes the results from that study.

The purposes of this study are to develop a profile of recreational storm chasers in the United States and to examine the operational attributes of these tours. To address these purposes, a survey was developed to collect the following information: socio-demographics, motivations and sensation seeking attributes of storm chasers; tour behavior characteristics; and perceived importance and performance of different tour operational attributes (see Appendix A).

Partnering tour operators distributed the surveys among their customers between April and August 2009. According to the study protocol, tour operators handed the surveys to their customers and collected them in individually sealed envelopes at the end of the tour to protect the confidentiality of respondents. To encourage participation, respondents were entered into a drawing for two US$50 visa cards. A total of 50 storm chasing tour participants responded to the survey for a 43.5% response rate (50/115).

This report is organized into five sections. Section I profiles storm chasers based on their socio-demographic characteristics. Section II summarizes the tour behavior attributes of recreational storm chasers. Section III assesses the motivations and sensation seeking attributes of recreational storm chasers. Finally, section IV examines the importance and performance of storm chasing tours operational attributes.

SECTION I

PROFILING THE RECREATIONAL STORM CHASERS

Most Storm Chasers Are Middle-Aged, Single, and Without Children

Recreational storm chasers who responded to the survey were predominantly middle-aged; more than two-thirds (68.8%) were over 35 years old, and 39.6% were over 45 years old (Figure 1). Recreational storm chasers taking organized tours were highly educated; the majority (60.5%) reported having at least a college degree and over a quarter (25.6%) had an advanced degree (Figure 2). The majority of respondents were male (62.0%), White (95.8%), and non-Hispanic (92.5%) as shown in table 1.

Figure 1. Age Distribution of Respondents

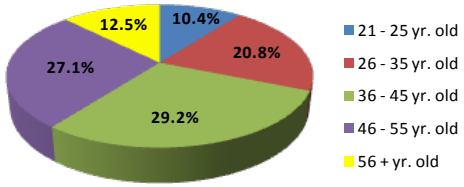


Figure 2. Highest Level of Education

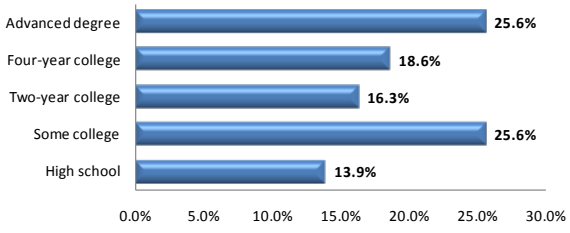


Table 1. Demographic profile of responding recreational storm chasers.

	Number of Respondents	Percent of Respondents
Gender (n=50)		
Female	19	38.0%
Male	31	62.0%
Race (n=47)		
White	45	95.8%
Other	2	4.2%
Ethnicity (n=40)		
Hispanic or Latino	3	7.5%
Not Hispanic or Latino	37	92.5%

Nearly two-thirds (63.3%) of respondents were single. An interesting finding is that about three-quarters (71.4%) of participants did not have children regardless if they were single or married/partnered, which is not consistent with the age distribution of respondents (Table 2). Only a small percentage (12.3%) of participants had children living at home. These results suggest that family obligations to children may hinder engagement in recreational storm chasing tours. This finding may also be associated with the large investment of time and money associated with this type of recreational activity.

Table 2. Family household composition of responding recreational storm chasers.

(n=49)	Number of Respondents		Percent of Respondents	
Without Children				
Single	27		55.1%	
Married/partnered	8		16.3%	
Sub Total		35		71.4%
With Children Living at Home				
Single	1		2.1%	
Married/partnered	5		10.2%	
Sub Total		6		12.3%
With Children No Longer Living at Home				
Single	3		6.1%	
Married/partnered	5		10.2%	
Sub Total		8		16.3%

Storm Chasers Are Full-Time Employees with Relative High Incomes

Over one-quarter (29.3%) of survey participants reported a gross annual household income of at least $75,000 which is relatively high taking into consideration the large proportion of single respondents as already described (Table 3). The majority (61.0%) had at least $50,000 of annual household income. Most participants (71.7%) were full-time employees, and a relatively large proportion of respondents (15.2%) were retired.

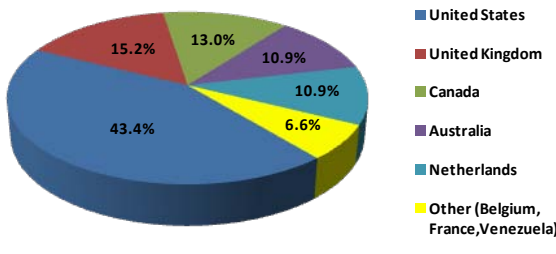
Table 3. Annual household income and employment status of responding recreational storm chasers.

	Number of Respondents	Percent of Respondents
Annual Household Income before Taxes (n=41)		
Less than $25,000	5	12.2%
$25,000 - $49,999	11	26.8%
$50,000 - $74,999	13	31.7%
$75,000 - $99,999	7	17.1%
$100,000 - $149,999	5	12.2%
Employment Status (n=46)		
Full-time employee	33	71.7%
Part-time employee	3	6.5%
Retired	7	15.2%
Student	1	2.3%
Other	2	4.3%

Storm Chasers Come from North America and Europe

Over half (56.4%) of participating recreational storm chasers were from North America which is not surprising because of the geographic proximity to the Tornado Alley (Figure 3). About a third of respondents came from Europe (30.5%). In order, the countries with the highest representation among responding storm chasers were: United States (43.4%), United Kingdom (15.2%), Canada (13.0%), Australia (10.9%) and the Netherlands (10.9%).

Figure 3. Country of Residence



SECTION II

TOUR ATTRIBUTES AND TOURIST BEHAVIOR OF RECREATIONAL STORM CHASERS

Most Storm Chasing Tours Last Two Weeks

The majority (72.0%) of the recreational storm chasing tours lasted two weeks (Table 4). Nearly half (48.9%) of respondents took the storm chasing tour alone which is consistent with the large proportion of respondents who were single as described above. About one-quarter (22.2%) of them were accompanied by friends.

Table 4. Party composition, length of the tour and ways customers learned about the tour operator.

	Number of Respondents	Percent of Respondents
Length of the Tour (n=50)		
1 week	14	28.0%
2 weeks	36	72.0%
Party Composition (n=45)		
Took the tour alone	22	48.9%[1]
Accompanied by friends	10	22.2%
Accompanied by spouse/partner	5	11.1%
Accompanied by siblings	5	11.1%
Accompanied by other family members	6	13.3%

[1] Percentages sum to more than 100%, as respondents were able to select multiple categories.

Storm Chasers Spot a Large Variety of Atmospheric Events while Touring

Storm chasing tours examined in this study were successful expeditions in terms of number and variety of atmospheric events tourists spotted on their trip. The vast majority of storm chasers (95.8%) reported spotting at least one atmospheric event during the chasing (Table 5). Hail was the most frequently spotted event (91.3%), closely followed by lightning (89.1%). About half of respondents spotted a funnel cloud (50.0%) or a microburst (47.8%) during their trip.

Impressively, over a third (34.8%) of respondents had the chance to experience at least one tornado during their expedition.

Table 5. Atmospheric events spotted during the tour.

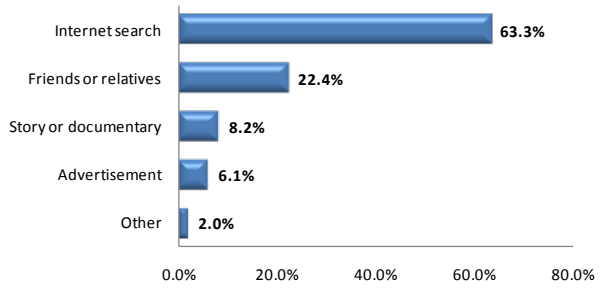
	Number of Respondents	Percent of Respondents
Whether An Event Was Spotted (n=48)		
Spotted at least one atmospheric event	46	95.8%
Did not spot anything	2	4.2%
Events Spotted on the Tour (n=46)[1]		
Hail	42	91.3%
Lightning	41	89.1%
Funnel cloud	23	50.0%
Microburst	22	47.8%
Tornado	16	34.8%
Other	10	21.7%

[1] Percentages sum to more than 100%, as respondents were able to select multiple categories.

Web-Sites and Word-of-Mouth Are Popular Ways to Learn about Storm Chasing

Almost two-thirds (63.3%) of respondents learned about their storm chasing tour operator from an internet search, suggesting that it is imperative to have an appealing web-site with updated and complete information of the tours offered (Figure 4). About one-quarter (22.4%) of participants learned about their tour operator from friends and relatives. On these regards, results suggest that it is important to pursue high levels of satisfaction in different aspects of the tour given the large proportion of referrals through word-of-mouth promotion found in this study.

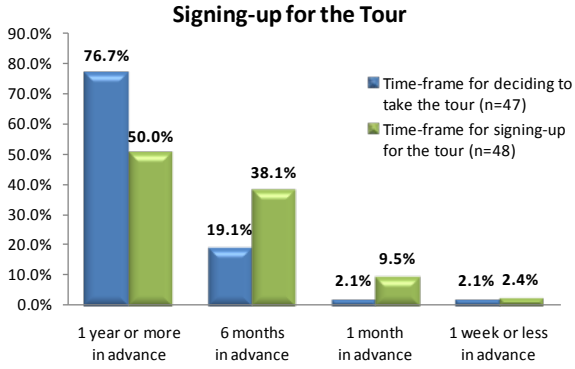
Figure 4. Ways Customers Learned about Tour Operators



Taking a Storm Chasing Tour Is a Well Thought and Planned Decision

Making the decision to embark in a storm chasing tour appears to be a well thought and planned decision. Over three-quarters (76.7%) of respondents decided to take a storm chasing tour one year in advance of the tour, and half (50.0%) actually signed-up for the tour at that time (Figure 5). A small proportion of respondents either decided (4.2%) or signed-up (11.9%) for their tour within one month prior to the tour. These results suggest that information provided in operators' communication channels, mainly their websites, should cover activities, tours, and programs at least one year ahead if possible.

Figure 5. Time-Frame for Deciding Taking or Signing-up for the Tour



Storm Chasing Is Not a One-time Recreational Experience

Storm chasing does not seem to be a recreational activity engaged in for one time; the majority of respondents had at least one type of previous experience, are actively involved with different related activities, and would be willing to continue their participation in the future. The majority (53.2%) of storm chasers that responded to the survey had at least one past storm chasing experience (Table 6). From these, about half (48.9%) took an organized tour before and nearly one third (29.8%) encountered a tornado before. Results also showed a relatively high level of current engagement with recreational storm chasing. About half (49.0%) of respondents considered themselves knowledgeable on storm chasing, and about a third (30.0%) were members to at least one type of weather related organization. Impressively, over one-quarter had their own equipment for storm chasing (28.0%) and 24.0% subscribed to at least one weather related magazine.

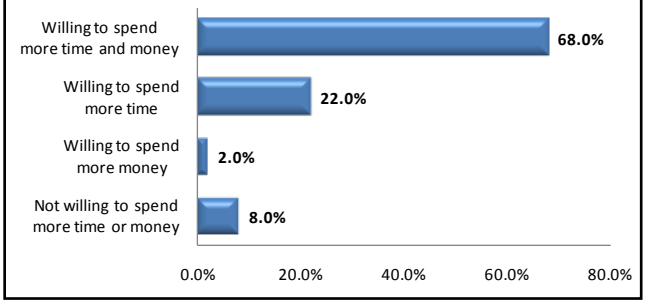
Table 6. Indicators of previous and current engagement in recreational storm chasing.

	Number of Respondents	Percent of Respondents
Previous Experience in Storm Chasing (n=50)		
Had at least one experience	28	53.2%
Did not have any previous experience	22	46.8%
Types of Previous Experience (n=47)[1]		
Encountered a tornado before	14	29.8%
Chased tornado for fun	7	14.9%
Job/study is weather related	3	6.4%
Took an organized tour before	23	48.9%
Indicators of Current Involvement (n=50)[1]		
Have own equipment	14	28.0%
Member of a weather related organization	15	30.0%
Subscribe to at least one weather related magazine	12	24.0%
Consider oneself knowledgeable on storm chasing	24	49.0%

[1] Percentages sum to more than 100%, as respondents were able to select multiple categories.

Importantly for the continuity of this type of niche tourism activity, the majority (68.0%) of respondents indicated that they were willing to spend more time and more money in this activity in the future and another 22.0% would invest more time in this activity (Figure 6). A very small proportion (8.0%) were not willing to spend any more time or money on storm chasing in the future.

Figure 6. Indicators of Future Engagement in the Storm Chasing



Respondents Are Satisfied with Their Storm-chasing Experience and Their Tours

Results suggest that storm chasers were satisfied with their storm chasing experience as the large majority would recommend their tour to others (94.0%); would take another tornado chasing tour with the same company (90.0%); or would recommend tornado chasing to others

(80.0%) as table 7 shows. These high levels of satisfaction and willingness to recommend tours are particularly important given the large proportion of referrals through word-of-mouth. Further, less than a quarter of respondents (24.0%) would take another tornado chasing tour with another company. Less than a third (28.6%) would do tornado chasing on their own, suggesting that most respondents recognized the important role of tour operators in this type of recreation, likely regarding safety concerns.

Table 7. Indicators of future engagement in recreational storm chasing.

(n=50)	Very Unlikely	Unlikely	Neutral	Likely	Very Likely	Mean [1]
Would recommend their tour to others	4.0%	0.0%	2.0%	30.0%	64.0%	(4.50)
Would take another tornado chasing tour with this company	4.0%	2.0%	4.0%	26.0%	64.0%	(4.44)
Would recommend tornado chasing to others	4.0%	6.0%	10.0%	26.0%	54.0%	(4.20)
Would do tornado chasing on your own	38.8%	20.4%	12.2%	14.3%	14.3%	(2.45)
Would take another tornado chasing tour with another company	38.0%	20.0%	18.0%	16.0%	8.0%	(2.36)

[1] This is the average of responses measured on a 5 point scale from (1) Very Unlikely to (5) Very Likely.

SECTION III

MOTIVATION AND SENSATION SEEKING OF RECREATIONAL STORM CHASERS

This study assessed the motivations driving recreational storm chasing and the sensation seeking traits of their participants as this information can be incorporated in advertising efforts and activities programming of storm chasing tours.

Enjoying Nature and Learning Experiences Are Important Motivations for Storm Chasing

This study examined 21 motivations that are usually associated with recreational activities using a five-point Likert scale ranging from (1) Very Unimportant to (5) Very Important. Since motivations for outdoor recreation are very diverse in nature, we classified them in six categories: (1) *Enjoying Nature*, (2) *Learning*, (3) *Stimulation*, (4) *Socializing with Similar People*, (5) *Taking Risks*, and (6) *Sense of Achievement* following the model proposed by Driver (1983).

Respondents perceived *Enjoying Nature* (mean=4.37) and *Learning* (mean=4.25) as the most important motivation dimensions for engaging in recreational storm chasing (Table 8). Regarding *Enjoying Nature*, the large majority of respondents considered important or very important "to enjoy the sights of nature" (92.0%), "to experience the power of nature" (90.0%), and "to be close to nature" (86.0%). Similarly, pertaining to *Learning*, most respondents considered important or very important "to develop their knowledge" (90.0%), to "learn more about tornados or storms" (87.8%), and "to experience new and different things" (81.2%). These results suggest that nature and educational messages should be included in all advertising efforts and communication channels (e.g., website information). In this sense, it is especially important that operators emphasize the opportunities their tours provide to develop or enhance tourist's knowledge on storms and tornados. Results also suggest that learning and nature centered activities programmed during the tour, especially during non-action times, could be well received.

Table 8. Importance of motivations for recreational storm chasing.

Motivation Dimensions and Items (n=50)	Very Un-important	Un-important	Neutral	Important	Very Important	Mean[1]
Enjoying Nature (EN)						
To enjoy the sights of nature	4.0%	4.0%	0.0%	26.0%	66.0%	(4.46)
To experience the power of nature	4.0%	0.0%	6.0%	28.0%	62.0%	(4.44)
To be close to nature	2.0%	2.0%	10.0%	44.0%	42.0%	(4.22)
Composite mean - EN						**(4.37)**
Learning (LN)						
To learn more about tornados/storms	2.0%	4.1%	6.1%	28.6%	59.2%	(4.39)
To develop my knowledge of tornados/storms	2.0%	4.0%	4.0%	44.0%	46.0%	(4.28)
To experience new & different things	2.1%	6.3%	10.4%	45.8%	35.4%	(4.06)
Composite mean - LN						**(4.25)**
Stimulation (ST)						
To have thrills and excitement	2.0%	10.2%	12.2%	40.8%	34.7%	(3.96)
To feel exhilaration	0.0%	14.0%	12.0%	38.0%	30.0%	(3.89)
To experience a lot of action	2.0%	6.0%	18.0%	62.0%	12.0%	(3.76)
Composite mean - ST						**(3.84)**
Socializing with Similar People (SP)						
To be with people who have similar interests	0.0%	2.0%	8.2%	57.1%	32.7%	(4.20)
To be with others who enjoy the same things I do	0.0%	8.0%	16.0%	54.0%	22.0%	(3.90)
To be with members of my group	2.0%	14.0%	42.0%	26.0%	16.0%	(3.40)
Composite mean - SP						**(3.83)**
Taking Risks (TR)						
To experience not knowing what will happen	2.0%	8.2%	28.6%	44.9%	16.3%	(3.65)
To take risks	6.0%	20.0%	34.0%	36.0%	4.0%	(3.12)
To be in dangerous situations	6.0%	22.0%	42.0%	24.0%	6.0%	(3.02)
Composite mean - TR						**(3.25)**
Sense of Achievement (AC)						
To challenge myself	4.0%	20.0%	30.0%	34.0%	12.0%	(3.30)
To gain a sense of self-confidence	8.3%	16.7%	52.1%	16.7%	6.3%	(2.96)
To show myself I can do it	12.0%	24.0%	38.0%	20.0%	6.0%	(2.84)
To do something impressive	10.0%	36.0%	34.0%	16.0%	4.0%	(2.68)
To be recognized for doing it	18.0%	32.0%	34.0%	14.0%	2.0%	(2.50)
To show others I can do it	30.6%	22.4%	30.6%	12.2%	4.1%	(2.37)
Composite mean - AC						**(2.77)**

[1] This is the average of responses measured on a five-point scale ranging from (1) Very Unimportant to (5) Very Important.

Stimulation (mean=3.84) and *Socializing with Similar People* (mean= 3.83) were also important motivations driving storm chasing. More than two thirds of respondents considered important or very important "to have thrills and excitement" (75.5%), "to experience a lot of action" (74.0%), and "to feel exhilaration" (68.0%). A large proportion of respondents also perceived important or very important "to be with people who have similar interests" (89.8%) and "to be with people who enjoy similar things" (76.0%). These results suggest that tour operators should make sure to emphasize that storm chasing is a very stimulating recreation activity which also provides the opportunity to meet people with similar interests. It is also worth noting that *Taking Risks* (mean= 3.25) was ranked as a moderately important motivation; more than half of respondents (61.2%) considered it important or very important "to experience not knowing what will happen" as a motivation to take storm chasing tours. The only motivation that did not appear to be an important motivation for taking storm chasing tours was *Sense of Achievement* (mean= 2.77).

Storm Chasers Seek New Experiences

Sensation seeking is a personality trait defined by the search of varied, novel, complex and intense sensations and experiences that imply taking certain types of risks (Zuckerman, 1994). Given that many recreational activities imply taking some sort of risks, this study examined sixteen attributes associated with sensation seeking among responding storm-chasers representing four dimensions: *Experience Seeking, Disinhibition, Thrill and Adventure Seeking,* and *Boredom Susceptibility* (Zuckerman, 1979). The sixteen attributes were measured using a five-point Likert scale anchored in (1) Strongly Disagree and (5) Strongly Agree. In general terms, the higher the agreement with a certain sensation seeking statement, the higher the sensation seeking an individual is. However, as some statements were measured in reverse order (i.e., higher the agreement, lower the sensation seeking), some results have been converted to facilitate the interpretation of the results.

Table 9. Level of agreement with sensation seeking attributes among recreational storm chasers.

Sensation Seeking Dimensions and Items (n=50)	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	Mean[1]
Experience Seeking (ES)						
I like to explore strange places	0.0%	4.0%	6.0%	44.0%	46.0%	(4.32)
I like to try new foods that I have never tasted before	4.1%	14.3%	14.3%	42.9%	24.5%	(3.69)
I may change my itinerary on impulse when I travel	2.0%	22.0%	32.0%	44.0%	4.0%	(3.22)
I prefer not to use a guide even in a place I don't know	12.0%	24.0%	42.0%	20.0%	2.0%	(2.76)
Composite Mean - ES						**(3.50)**
Disinhibition (DIS)						
I like to have unconventional exciting experiences	0.0%	4.0%	18.0%	42.0%	36.0%	(4.10)
I like friends that are different than me	0.0%	12.0%	28.0%	48.0%	12.0%	(3.60)
Stimulants make me uncomfortable	6.0%	22.0%	52.0%	12.0%	8.0%	(3.06)[2]
I prefer quiet parties with good conversation	4.0%	16.0%	40.0%	26.0%	14.0%	(2.70)[2]
Composite Mean - DIS						**(3.37)**
Thrill and Adventure Seeking (TAS)						
Relaxation is my most important goal for recreation	20.0%	18.0%	34.0%	22.0%	6.0%	(3.24)[2]
I prefer safe sports/activities (e.g., yoga)	16.0%	22.0%	34.0%	16.0%	12.0%	(3.14)[2]
I like to do frightening things	10.0%	22.0%	28.0%	24.0%	16.0%	(3.14)
I like to try risky sports	24.0%	26.0%	16.0%	16.0%	18.0%	(2.78)
Composite Mean - TAS						**(3.08)**
Boredom Susceptibility (BS)						
I get restless when I spend too much time at home	8.0%	12.0%	28.0%	30.0%	22.0%	(3.46)
I prefer friends who are excitingly unpredictable	10.0%	14.0%	48.0%	18.0%	10.0%	(3.04)
I like the comfortable familiarity of my usual environment	6.0%	22.0%	28.0%	38.0%	6.0%	(2.94)[2]
I don't mind watching a movie I have seen before	0.0%	12.0%	12.0%	52.0%	24.0%	(2.12)[2]
Composite Mean - BS						**(2.89)**

[1] This is the average of agreement/disagreement on a 5 point scale from (1) Strongly Disagree to (5) Strongly Agree.
[2] These are reversed means indicating that because of the opposite wording of the sensation seeking attributes, the scale mean for this particular item is reversed. For example, a "Strongly Disagree" for the "Relaxation is my most important goal for recreation" item indicates a high sensation seeking level. Percentages were not changed.

Responding storm chasers have high sensation seeking levels on the *Experience Seeking* dimension (mean= 3.50) as shown in table 9. For example, most respondents reported that they like to explore strange places (90.0%) and try new foods that have never tasted before (67.4%), and about half (48.0%) may change itinerary on impulse when travel. Similarly, respondents also ranked high in the *Disinhibition* dimension (mean= 3.37), as the majority reported that they like to have unconventional exciting experiences (78.0%) or like friends that are different than them (60.0%). However, it is worth noting that both dimensions include items with low rankings including the preference for having a guide in a place they don't know (mean=2.76) and preferring quiet parties with good conversation (mean=2.70), which reduce their sensation seeking traits.

Results show that recreational storm chasers were overall neutral in *Thrill and Adventure* (mean= 3.05). Although over one-third (38.0%) of respondents do not consider relaxation as the most important goal for recreation, a large proportion reported that they prefer not trying risky sports (50.0%) or doing frightening things (32.0%). Similarly, respondents ranked low (or close to neutral) on their *Boredom Susceptibility* (mean= 2.89). Just slightly more than half of respondents (52.0%) reported getting restless when spending too much time at home; however, a large proportion of respondents reported that they don't mind watching a movie they have seen before (76.0%) and like the comfortable familiarity of their usual environment (44.0%).

SECTION IV

IMPORTANCE AND PERFORMANCE ANALYSIS OF STORM CHASING TOURS

This study examined twenty-two operational attributes of storm chasing tour operators representing four business components: *Tour Operator, Tour Package, Education and Information,* and *Logistics*. Recreational storm chasers were asked how important each attribute within each business category were to them. Then, they were asked to rate the performance of their tour operators in each of these attributes. Importance was rated on a five-point Likert scale, ranging from (1) Very Unimportant to (5) Very Important, while performance was rated on a similar scale ranging from (1) Very unsatisfied to (5) Very satisfied.

The Operator and their Personnel Are Very Important Components of Storm Chasing Tours

Storm chasers perceived that the *Tour Operator* was the most important business component of storm chasing tours (mean=4.64) confirming that safety and customer service were practices that tourists highly value (Table 10). The vast majority of respondents considered that the experience (93.9%) and knowledge (89.6%) of the guides were very important for them, results that are not surprising as these two elements can significantly reduce any risk associated with storm chasing. A friendly attitude and good driving skills of the tour staff were also very important to a large proportion of storm chasers (79.6% and 81.3% respectively).

The *Tour Package* (mean=4.34) and *Education and Information* (mean=4.28) were two business components also considered important by storm chasers. In specific, the price and the length of the tour and the number of people per group were considered very important by over half of respondents (57.1%, 56.3% and 53.1% respectively). Learning and safety instructions during the trip were considered very important for most respondents (53.1% and 55.1% respectively). Although respondents ranked the *Logistic* as the least important (mean=3.94) business component, it was still ranked as important and a large proportion considered that the weather forecasting equipment (71.4%) and the comfort and reliability of the vehicle (65.3%) were very

important aspects in storm-chasing. In turn, 28.5% considered the offerings of souvenirs and memorabilia as unimportant.

Table 10. Perceived importance of tour operational attributes by recreational storm chasers.

Operational Attributes by Business Component [1]	Very Un-important	Somewhat Unimportant	Neutral	Somewhat Important	Very Important	Mean[2]
Tour Operator						
Experience of guide	2.0%	0.0%	0.0%	4.1%	93.9%	(4.88)
Knowledge of guide	2.1%	0.0%	0.0%	8.3%	89.6%	(4.83)
Friendly attitude of guide/staff	2.0%	0.0%	2.0%	16.3%	79.6%	(4.71)
Driving skills of guides/staff	2.1%	0.0%	6.3%	10.4%	81.3%	(4.69)
Responsiveness of tour operator	0.0%	0.0%	8.7%	15.2%	76.1%	(4.67)
Ease to contact the tour operator	0.0%	6.3%	6.3%	29.2%	58.3%	(4.40)
Ease of booking/registration	0.0%	4.1%	12.2%	34.7%	49.0%	(4.29)
Composite mean						**(4.64)**
Tour Package						
Price of tour	0.0%	2.0%	6.1%	34.7%	57.1%	(4.47)
Length of tour	0.0%	4.2%	8.3%	31.3%	56.3%	(4.40)
Number of people per group	0.0%	6.1%	12.2%	28.6%	53.1%	(4.29)
Tour design and itinerary	0.0%	2.1%	18.8%	37.5%	41.7%	(4.19)
Composite mean						**(4.34)**
Education and Information						
Learning during the trip	2.0%	2.0%	6.1%	36.7%	53.1%	(4.37)
Safety instructions during the chase	2.0%	0.0%	12.2%	30.6%	55.1%	(4.37)
Website information	2.0%	2.0%	10.2%	40.8%	44.9%	(4.24)
User friendly website	2.0%	2.0%	14.3%	44.9%	36.7%	(4.12)
Composite mean						**(4.28)**
Logistics						
Weather forecasting equipment	2.0%	0.0%	6.1%	20.4%	71.4%	(4.59)
Vehicle comfort and reliability	2.0%	0.0%	8.2%	24.5%	65.3%	(4.51)
Lodging and accommodation	0.0%	2.1%	14.6%	52.1%	31.3%	(4.13)
Provision of meals	2.1%	2.1%	33.3%	37.5%	25.0%	(3.81)
Activities during "non-action" time	6.1%	4.1%	20.4%	42.9%	26.5%	(3.80)
Provision of snacks and drinks	4.2%	4.2%	39.6%	35.4%	16.7%	(3.56)
Souvenir and memorabilia offerings	6.1%	22.4%	40.8%	12.2%	18.4%	(3.14)
Composite mean						**(3.94)**

[1] Number of the participants responding to this question ranges from 46 to 49. See table 12 for specific numbers.
[2] This is the average of responses measured on a five-point scale ranging from (1) Very Unimportant to (5) Very Important.

Table 11. Perceived performance of tour operational attributes by recreational storm chasers.

Operational Attributes by Business Component [1]	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied	Mean[2]
Tour Operator						
Experience of guide	0.0%	0.0%	0.0%	18.0%	82.0%	(4.82)
Knowledge of guide	0.0%	0.0%	0.0%	18.4%	81.6%	(4.82)
Friendly attitude of guide/staff	0.0%	0.0%	0.0%	24.0%	76.0%	(4.76)
Driving skills of guides/staff	0.0%	0.0%	8.2%	18.4%	73.5%	(4.65)
Ease to contact the tour operator	0.0%	0.0%	6.1%	22.4%	71.4%	(4.65)
Responsiveness of tour operator	0.0%	0.0%	6.4%	27.7%	66.0%	(4.60)
Ease of booking/registration	0.0%	2.0%	8.0%	26.0%	64.0%	(4.52)
Composite mean						**(4.68)**
Education and Information						
Safety instructions during the chase	0.0%	0.0%	2.0%	32.0%	66.0%	(4.64)
Website information	0.0%	0.0%	6.0%	36.0%	58.0%	(4.52)
User friendly website	0.0%	0.0%	8.0%	44.0%	48.0%	(4.40)
Learning during the trip	0.0%	6.0%	10.0%	28.0%	56.0%	(4.34)
Composite mean						**(4.48)**
Tour Package						
Length of tour	0.0%	0.0%	0.0%	24.5%	75.5%	(4.76)
Number of people per group	2.0%	0.0%	12.0%	34.0%	52.0%	(4.34)
Tour design and itinerary	0.0%	4.1%	12.2%	30.6%	53.1%	(4.33)
Price of tour	0.0%	8.0%	14.0%	44.0%	34.0%	(4.04)
Composite mean						**(4.36)**
Logistics						
Weather forecasting equipment	0.0%	2.0%	4.0%	28.0%	66.0%	(4.58)
Vehicle comfort and reliability	0.0%	2.0%	6.0%	34.0%	58.0%	(4.48)
Lodging and accommodations	0.0%	6.0%	6.0%	40.0%	48.0%	(4.30)
Activities during "non-action" time	0.0%	6.0%	16.0%	24.0%	54.0%	(4.26)
Provision of meals	0.0%	4.1%	26.5%	30.6%	38.8%	(4.04)
Provision of snacks and drinks	0.0%	2.1%	27.1%	37.5%	33.3%	(4.02)
Souvenir and memorabilia offerings	0.0%	0.0%	30.0%	40.0%	30.0%	(4.00)
Composite mean						**(4.25)**

[1] Number of the participants responding to this question ranges from 47 to 50. See table 12 for specific numbers.
[2] This is the average of responses measured on a five-point scale ranging from (1) Very Unsatisfied to (5) Very Satisfied.

Storm Chasers Are Very Satisfied with the Tour Operator and the Information Provided

Overall, storm chasers were very satisfied with the four business components examined. *Tour Operators* especially excelled on the experience and the knowledge of their guides (means=4.82), the friendly attitude of their staff (mean=4.76) and the length of the tour (mean=4.76) as the vast majority of respondents were satisfied with these attributes (Table 11). The items with the lowest satisfaction included the price of the tour (mean=4.04) and some *Logistics* elements such as the provision of meals (mean=4.04), snacks and drinks (mean=4.02) and the offerings of souvenirs and memorabilia (mean=4.00). Although the mean scores indicate that respondents *were* satisfied with these tour attributes, it is important to recognize that among all the elements, these were lower than the other items.

Keep Up the Good Work on the Tour Operator but Concentrate on the Package

Examining the importance and satisfaction of customers is important to assess the overall performance of business endeavors. However, it is even more critical to contrast both indicators to identify strengths and areas in need of improvement. For example, as table 12 shows, storm chasers perceived that the operator (mean=4.64) and the package (mean=4.34) were the two most important business components of storm chasing. However, they were most satisfied with the operator (mean=4.68) and the education and information (mean=4.48) components. These results suggest some areas to focus regarding the importance and satisfaction with the package of the tours.

The Importance-Performance Analysis (IPA) was developed by Martilla and James (1977) to ease the comparison between performance and satisfaction for making management decisions. IPA is a graphic in which the importance and performance of given attributes are located on a matrix with four quadrants: (1) “Keep Up the Good Work” indicates both high importance and high performance; (2) “Low Priority” is the opposite; (3) “Possible Overkill” indicates low

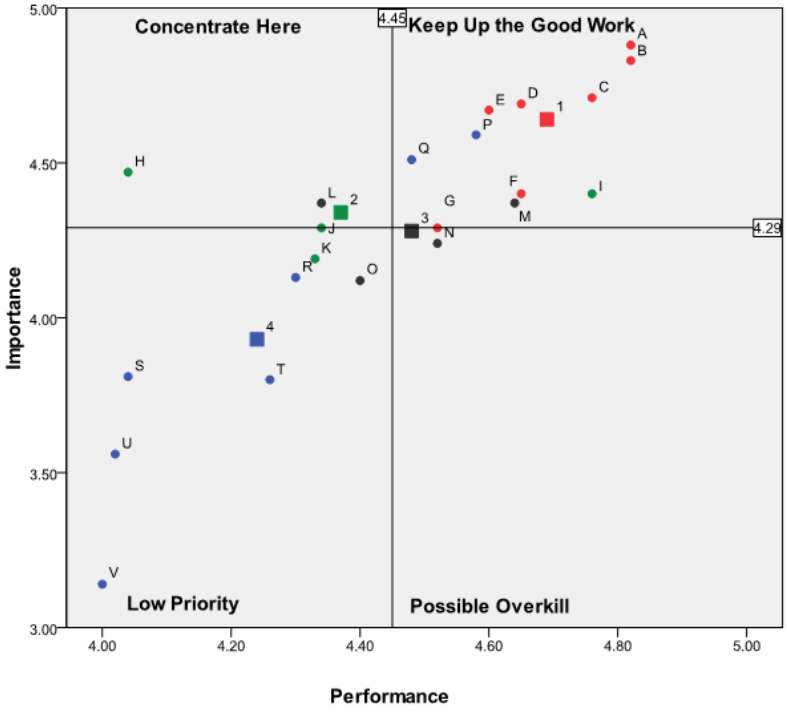
Table 12. Average perceived importance and performance of tour operator attributes by recreational storm chasers.

Operational Attributes by Business Component	Importance		Performance	
	Number	Mean[1]	Number	Mean[2]
Tour Operator				
Experience of guides (A)	49	4.88	50	4.82
Knowledge of guides (B)	48	4.83	49	4.82
Friendly attitude of guide/staff (C)	49	4.71	50	4.76
Driving skills of guides/staff (D)	48	4.69	49	4.65
Responsiveness of tour operator (E)	46	4.67	47	4.60
Ease to contact/reach the tour operator (F)	48	4.40	49	4.65
Ease of booking/registration (G)	49	4.29	50	4.52
Composite mean		**4.64**		**4.68**
Tour Package				
Price of tour (H)	49	4.47	50	4.04
Length of tour (I)	48	4.40	49	4.76
Number of people per group (J)	49	4.29	50	4.34
Tour design and itinerary (K)	48	4.19	49	4.33
Composite mean		**4.34**		**4.36**
Education and Information				
Learning during the trip (L)	49	4.37	50	4.34
Safety instructions during the chase (M)	49	4.37	50	4.64
Website information (N)	49	4.24	50	4.52
User friendly website (O)	49	4.12	50	4.40
Composite mean		**4.28**		**4.48**
Logistics				
Weather forecasting equipment (P)	49	4.59	50	4.58
Vehicle comfort and reliability (Q)	49	4.51	50	4.48
Lodging and accommodations (R)	48	4.13	49	4.30
Provision of meals (S)	48	3.81	49	4.04
Activities during "non-action" time (T)	49	3.80	50	4.26
Provision of snacks and drinks (U)	48	3.56	48	4.02
Souvenir and memorabilia offerings (V)	49	3.14	50	4.00
Composite mean		**3.94**		**4.25**

[1] This is the average of responses measured on a five-point scale ranging from (1) Very Unimportant to (5) Very Important.
[2] This is the average of responses measured on a five-point scale ranging from (1) Very Unsatisfied to (5) Very Satisfied.

importance but high performance; and (4) "Concentrate Here" represents high importance but low performance (Chu & Choi, 2000). However, it is important to note that because respondents generally rated operational attributes as important and were satisfied with the performance, low importance or performance actually represents a relative comparison of *lower* importance or performance, and thus areas that would benefit from attention.

Figure 7. Perceived Importance and Performance of Operational Attributes of Recreational Storm Chasing



Legend

Operational Components
1: Tour Operator (A, B, C, D, E, F, G)
2: Tour Package (H, I, J, K)
3: Education and information (L, M, N, O)
4: Logistics (P, Q, R, S, T, U, V)

Operational Items
A: Experience of guides
B: Knowledge of guides
C: Friendly attitude of guide/staff
D: Driving skills of guides/staff
E: Responsiveness of tour operator
F: Ease to contact the tour operator
G: Ease of booking/registration
H: Price of tour
I: Length of tour
J: Number of people per group
K: Tour design and itinerary
L: Learning during the trip
M: Safety instructions during the chase
N: Website information
O: User friendly website
P: Weather forecasting equipment
Q: Vehicle comfort and reliability
R: Lodging and accommodations
S: Provision of meals
T: Activities during "non-action" time
U: Provision of snacks and drinks
V: Souvenir and memorabilia offerings

The plotting of the importance and satisfaction ratings of all the business components and their operational items on the IPA grid suggest that storm chasing companies are doing a good work on the *Tour Operator* component and all their items, effort that should be sustained over time (Figure 7). However, IPA showed that to improve satisfaction these companies could place

more effort on their *Tour Packages* as it this business component was captured on the "Concentrate Here" quadrant indicating a lower than average performance of highly important items. This is especially pertinent to the price of the tour as the performance was one of the lowest of all the items while being perceived as very important. Companies could also pay more attention to providing learning experiences during the expedition, a tour element that is critical to take into consideration given that educational opportunities appeared as an important motivator for engaging in recreational storm chasing.

Although IPA revealed that the website fell within the "Possible Overkill" quadrant suggesting that too much effort is possibly placed on this item, this result should be interpreted with caution. Websites are powerful communication and marketing tools, especially for niche tourism activities, with the capacity to capture a geographically disperse clientele such as recreational storm chasers. Hence, too much effort should not be interpreted as vain. It is also worth mentioning that many *Logistic* items, such as the provision of meals, snacks and memorabilia were captured by the "Low Priority" quadrants. Therefore, tour operators are doing fine given the relative importance of these attributes.

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Appendix A

The Recreational Storm Chaser Study

Dear tornado/storm chaser,

Thank you for completing this survey. The University of Missouri's Department of Parks, Recreation and Tourism is conducting this survey to better understand the characteristics and motivations of tornado/storm chasers. This survey will also provide tour operators with information to make their tours even better.

This survey will take you less than 10 minutes to complete. We hope that you will decide to complete this survey, but you are under no obligation to respond to all, or any particular question. After completing the survey, please place it inside the provided envelope, seal the envelope, and return it to the tour operator. The University of Missouri has strict protocols to protect the confidentiality and privacy of participants in our research studies.

To thank you for your participation, you will be entered into a drawing for the chance to win two (2) $50.00 gas cards if you choose to give us your contact information. We will not distribute your contact information to any individual, organization or company and will destroy these records after the drawing.

Again, thank you for your willingness to take this survey. We really appreciate your time and participation. If you have any questions, please contact us.

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SCHOOL OF NATURAL RESOURCES
Parks, Recreation & Tourism

Thank you for taking the time to complete this survey on your tornado/storm chasing experience.

1. How long is this storm chasing tour? ❒1 day ❒2-3 days ❒1 week ❒2 weeks ❒2+weeks

2. With whom are you taking this tour? *Check all that apply.*

❒I came alone ❒Friends ❒My spouse/partner
❒My child(ren) ❒Brothers/sisters ❒Other family members ❒Other

3. Please indicate the number of times that you spotted the following events on this tour: *Write in the number for each event.*

(___) Tornado (___) Lightning event (___) Microburst
(___) Hail (___) Funnel cloud (___) Other (*specify*): _____
❒I didn't see anything (*storm chase bust*)

4. How did you find out about this tour operator?

❒Friends/relatives ❒Internet search ❒Story/Documentary ❒Advertisement ❒Other (*specify*): _____

5. How far in advance did you…

Decide to go tornado/storm chasing?	❒The same day	❒1 week	❒1 month	❒6 months	❒1 year or more
Sign up for this tour?	❒The same day	❒1 week	❒1 month	❒6 months	❒1 year or more

6. Prior to this tour, indicate your experience with tornado/storm chasing. *Check all that apply.*

❒I have seen a tornado in person ❒I have chased tornados on my own for fun
❒My job/study is weather related ❒I have been on an organized tour in the past ❒None

7. Please indicate whether you…

Own equipment for storm/tornado chasing?	❒Yes	❒ No
Are a member of a weather related organization?	❒Yes	❒ No
Subscribe to a weather related magazines?	❒Yes	❒ No
Consider yourself knowledgeable on tornado/storm chasing?	❒Yes	❒ No

8. Are you willing to spend more time or money on tornado/storm chasing in the future?

❒Yes, more time and money ❒Yes, more time ❒Yes, more money ❒ No

9. Please indicate your overall level of satisfaction with this tornado/storm chasing experience.

❒Very dissatisfied ❒Dissatisfied ❒Neither ❒Satisfied ❒ Very satisfied

10. How likely are you to do the following?

	Very Unlikely	Unlikely	Neither	Likely	Very Likely
Take another tornado/storm chasing tour with this company	❒	❒	❒	❒	❒
Take another tornado/storm chasing tour with another company	❒	❒	❒	❒	❒
Do tornado/storm chasing on your own	❒	❒	❒	❒	❒
Recommend tornado/storm chasing to others	❒	❒	❒	❒	❒
Recommend this tour to others	❒	❒	❒	❒	❒

11. How much do you agree or disagree with the following statements?

Statements	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
I like to try risky sports/activities (e.g., bungee jumping)	❒	❒	❒	❒	❒
I prefer friends who are excitingly unpredictable	❒	❒	❒	❒	❒
I like friends that are different than me	❒	❒	❒	❒	❒
I like to try new foods that I have never tasted before	❒	❒	❒	❒	❒
I prefer quiet parties with good conversation	❒	❒	❒	❒	❒
I like to explore strange places	❒	❒	❒	❒	❒
I don't mind watching a movie I have seen before	❒	❒	❒	❒	❒
Relaxation is my most important goal for recreation	❒	❒	❒	❒	❒
I get restless when I spend too much time at home	❒	❒	❒	❒	❒
Stimulants make me uncomfortable	❒	❒	❒	❒	❒
I may change my itinerary on impulse when I travel	❒	❒	❒	❒	❒
I prefer safe sports/activities (e.g., yoga)	❒	❒	❒	❒	❒
I like to have unconventional exciting experiences	❒	❒	❒	❒	❒
I prefer not to use a guide even in a place I don't know	❒	❒	❒	❒	❒
I like the comfortable familiarity of my usual environment	❒	❒	❒	❒	❒
I like to do frightening things	❒	❒	❒	❒	❒

12. How important are the following reasons for going tornado/storm chasing?

Reasons	Very Unimportant	Unimportant	Neither	Important	Very Important
To challenge myself	❒	❒	❒	❒	❒
To have thrills and excitement	❒	❒	❒	❒	❒
To be in dangerous situations	❒	❒	❒	❒	❒
To be with members of my group	❒	❒	❒	❒	❒
To feel exhilaration	❒	❒	❒	❒	❒
To be recognized for doing it	❒	❒	❒	❒	❒
To be with people who have similar interests	❒	❒	❒	❒	❒
To enjoy the sights of nature	❒	❒	❒	❒	❒
To gain a sense of self-confidence	❒	❒	❒	❒	❒
To show myself I can do it	❒	❒	❒	❒	❒
To experience not knowing what will happen	❒	❒	❒	❒	❒
To be close to nature	❒	❒	❒	❒	❒
To experience a lot of action	❒	❒	❒	❒	❒
To take risks	❒	❒	❒	❒	❒
To develop my knowledge of tornados/storms	❒	❒	❒	❒	❒
To experience new and different things	❒	❒	❒	❒	❒
To show others I can do it	❒	❒	❒	❒	❒
To be with others who enjoy the same things I do	❒	❒	❒	❒	❒
To do something impressive	❒	❒	❒	❒	❒
To learn more about tornados/storms	❒	❒	❒	❒	❒
To experience the power of nature	❒	❒	❒	❒	❒

13. In your opinion, how important are the following tour attributes? And, how satisfied are you with them?

Attributes	Importance to You					Your Satisfaction				
	Very Unimportant	Somewhat Unimportant	Neither	Somewhat Important	Very Important	Very Unsatisfied	Unsatisfied	Neither	Satisfied	Very Satisfied
Friendly attitude of guides/staff	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Experience of guides	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Knowledge of guides	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Driving skills of guides/staff	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Responsiveness of tour operator	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Ease of booking/registration	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Ease to contact/reach the tour operator	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Price of tour	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Length of tour	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Number of people per group	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Tour design and itinerary	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Program activities during “non-action” time	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Lodging and accommodations	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Provision of meals	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Provision of snacks and drinks	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Souvenir and memorabilia offerings	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Weather forecasting equipment	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Vehicle comfort and reliability	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Learning during the trip	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Website information	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
User friendly website	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒
Safety instructions during the chase	❒	❒	❒	❒	❒	❒	❒	❒	❒	❒

Please, provide the following information about you and your family.

14. Your age: _____

15. Your gender: ❒ Female ❒ Male

16. Your family status:
- ❒ Single without children
- ❒ Single with children living at home
- ❒ Single with children no longer living at home
- ❒ Married/partnered without children
- ❒ Married/partnered with children living at home
- ❒ Married/partnered with children no longer living at home

17. The age of your children: *Check all that apply.*
- ❒ 6 or younger
- ❒ 13-17
- ❒ 7-12
- ❒ 18+
- ❒ Not applicable

18. Your highest level of education:
- ❒ High school graduate or less
- ❒ Four-year college degree
- ❒ Some college
- ❒ Advanced degree
- ❒ Two-year college degree

19. Your annual household income before taxes:
- ❒ Less than $25,000
- ❒ $25,000-$49,999
- ❒ $50,000-$74,999
- ❒ $75,000-$99,999
- ❒ $100,000-$149,999
- ❒ $150,000-$199,999
- ❒ $200,000 or more

20. Your employment status:
- ❒ Full time employee
- ❒ Part time employee
- ❒ Retired
- ❒ Student
- ❒ Unemployed
- ❒ Other

21. Your race:
- ❒ White
- ❒ Black or African American
- ❒ Asian
- ❒ Other

22. Your ethnicity:
- ❒ Hispanic or Latino
- ❒ Not Hispanic or Latino

23. Your zip code: _____

24. Do you have any additional comments or suggestions regarding this tour or the operator?

Thank You!

If you want to be entered into the drawing for the chance to win two (2) $50.00 gas cards, please enter your contact information.

Name: _____

E-mail address: _____

Phone number: _____

Your contact information will only be used for your entry into the drawing and to contact the prize winner. We will not distribute your contact information to any individual, organization or company.