Trail Conflicts on Rough Ridge & Bass Lake
Report Prepared for the Blue Ridge Parkway by Parkway Course at Appalachian State University

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Executive Summary
Students and faculty in a year-long course at Appalachian State University conducted research into trail use conflicts on two Blue Ridge Parkway trails: Rough Ridge and Bass Lake. Using a collaborative process of observations and interviews, we studied the causes behind visitors leaving the trail at Rough Ridge and visitor/animal conflicts at Bass Lake. Based on our study, we recommend that the Park service use three strategies to mitigate these problems: the construction of informational kiosks, the distribution of new educational materials through a variety of mechanisms, and the creation of a photo-op spot at Rough Ridge and a dog park at Bass Lake.

1 Problem Statement
Two trails on the Blue Ridge Parkway, Rough Ridge (near mile marker 301) and Bass Lake (part of the Moses Cone Park at mile marker 294), have long been identified by the Park Service as trouble spots. The problems occur primarily due to hiker misuse of the trails.

1.1 Rough Ridge Issues
The proximity of Rough Ridge trail to Blowing Rock and Boone, and the extraordinary views it affords hikers are (at least) two reasons why this trail is one the more popular along the Blue Ride Parkway. Its popularity and appeal has resulted in many hikers leaving the trail for a variety of reasons—which we will discuss later in this report. When hikers leave the trail, they disturb the natural environment and plant life which has been growing for hundreds of years. This in turn, has become detrimental to many rare plant species that live just off the trail corridor and is threatening the fragile ecosystem surrounding the trail. The purpose of the Parkway Research Course was to
partner with the Blue Ridge Parkway and its staff in an effort to determine the main reasons why people leave the trail and to seek possible solutions, thereby allowing the Rough Ridge trailway to remain open and be kept free from continued environmental harm.

1.2 Bass Lake Issues
The proximity of Rough Ridge trail to Blowing Rock and Boone and the appeal of an an easy, scenic, and relatively short flat loop are reasons they this trail experiences high use. In addition, an unusually wide variety of people use this trail (e.g., parents with kids, seniors citizens, joggers, dog owners, horseback riders, cross country teams, etc.) The high and varied use rate creates the potential for a number of conflicts along the trail (e.g., animal waste, animal aggression, overcrowding, noise, loose dogs, etc). The purpose of the Parkway Research Course was to partner with the Blue Ridge Parkway and its staff in an effort to determine the frequency of these conflicts and to seek possible solutions that would create a higher and more consistent level of enjoyment among all trail patrons.

2 Background
Appalachian State University (ASU) and the Blue Ridge Parkway have a long history of collaboration. In recent years, several factors came together to create this project. First, in the Fall of 2006, staff from the Parkway and faculty from ASU came together to discuss possible research opportunities. Dr. Norman Clark attended this event, and saw that collaboration with the Parkway
could provide opportunities for student research as well. As the faculty coordinator for the Public Service Research Program (PSRP), Dr. Clark was responsible for increasing the amount of student-conducted community-based research at ASU. After some initial discussions with Parkway staff, primarily Bambi Teague, Dr. Clark submitted and was awarded a small grant ($4,000 per year for 3 years) from Learn & Serve America to fund student research and travel with the Blue Ridge Parkway. Based on subsequent meetings with Bambi Teague and other staff at the Parkway, we decided to focus on observing trail behaviors at these two crucial trails located near ASU.

2.1 Timeline of project

June 2007  
CBR conference in Jackson, MS & initial course/project planning (Norm Clark, Todd Mortensen, Neva Specht, Bambi Teague)

Aug. 2007  
Class retreat & overnight camping trip along Parkway. Orientation to Parkway, NPS staff, CBR, initial observations at Rough Ridge & Bass Lake.

Sept. 2007  

Oct. 2007  
Observations at Rough Ridge & Bass Lake, Discussions on CPPE process, Discussions on Stringer Reading, Causal models enhanced, Begin literature review.

Nov 2007  
Observations continue, Causal models enhanced, Literature review continues, Visit from Parkway Ranger David Bauer, Urry readings on tourism, postmodernism & environment.

Dec 2007  
Causal models further developed, ASU Holiday break.

Jan 2008  
Course readings on Parkway History (Whisnant), Finalize causal models.

Feb 2008  
Intervention ranking tables initially developed, Campus & class visit by Dr. Randy Stoecker (UW-Madison CBR professor), Begin calling National Parks to discuss similar trail use conflicts, CPPE part 3.

Mar 2008  
Calling National Parks, Finalizing ranking tables, Hippopoc models, Continue Parkway history readings, CPPE part 4.

April 2008  
Data collating, Graphs, Charts, Report write-up, Presentation to Parkway staff, Registering second class cohort.
2.2 CPPE process
To guide our research, we followed the Comprehensive Participatory Planning and Evaluation model. In collaboration with Parkway staff, we first created causal models to hypothesize what were the root causes behind people leaving the Rough Ridge trail and potentially having negative experiences at Bass Lake (see Appendix A for the complete causal models).

In brief, we hypothesized that hikers leave the trail on Rough Ridge for the following primary reasons:
1. A believe that they are somehow an exception to the rule;
2. A desire for solitude or to get “closer” to a “natural” environment (no man-made objects in view);
3. A wish to get a better picture (again, “natural” or free of man-made objects); and
4. An expectation that leaving the trail is desirable/exciting, due to marketing materials showing people on ridges.

In brief, we hypothesized that conflicts/problems arise on Bass Lake trail for the following primary reasons:
1. Proximity to Blowing Rock;
2. Lack of information about other comparable trails;
3. Ease/desirability of trail leads to overcrowding; and
4. Regional attitude toward dogs encourages less supervision/leash use.

The next logical step was to gather data to test the accuracy of our hypotheses. This process is detailed below. Following this data collection and analysis, we proposed a number of possible interventions, assisted by interviewing park rangers from around the county about their trail use conflicts and mitigation efforts. For these interventions, we created ranking tables that rated how well these various strategies met the criteria we developed for interventions (see Appendix C for ranking tables).

Finally, after identifying three interventions for each trail that best fit our criteria, we developed HIPPOPOC tables for each intervention (see Appendix D for HIPPOPOC tables). HIPPOPOC models include the following information:
1. Inputs: what is needed to implement the plan;
2. Processes: a list of actions that should be done;
3. Outputs: immediate results of those actions; and
4. Outcomes: longer-term changes that would result from the plan and additional external factors related to the proposed actions.
3 Data Gathered
Our data collection process included two main sources. First, in the Fall of 2007, students observed trail usage on both Rough Ridge and Bass Lake. Second, in the Spring of 2008, students interviewed park rangers from various national parks about the trail conflicts at their parks, what efforts they had made to solve these problems, and how successful they had been.

3.1 Observations
During the Fall of 2007, students spent approximately 25 hours observing trail usage. Trail observation sheets were created in advance to assist students in recording their findings.

3.1.1 Process
Data was collected primarily through convenience sampling. Students went to the trails when they had free-time, primarily on the weekends and afternoons. Time was split equally between the trails. For the most part, students sat in one place and recorded observations as people walked by. See Appendix B for samples of the observation recording tables. Once the observations were completed, students entered the data into Minitab, a statistical analysis program. Minitab was used to generate correlations and charts and tables.
3.1.2 Totals
Rough Ridge
81 Total users
Age: 45 adults (56%), 13 kids (16%), 12 young adults (14%), and 11 seniors (14%).

Gender: 39 females (48%) and 42 males (52%).

Trail use: 64 stayed on the trail (79%), while 17 went off trail (21%).
2 (3%) visitors ended up taking something, while 79 (97%) didn’t take anything. Times: 50 (62%) visited during the day, while 31 (38%).

Weather: 47 (58%) visitors were there during cool weather, 31 (38%) during very nice weather, and 3 (4%) during cold weather.

Out of the 81 visitors, 75 (93%) didn’t bring dogs, 4 (5%) brought dogs on leashes and 2 (3%) brought dogs without leashes.
Bass Lake
90 Total users
26 dogs, 22 of which were on leashes, and 4 which were not on a leash, meaning about 85% of owners put their dog on a leash. The other 145 recorded observations did not report dogs/leashes, meaning about 18% of people bring dogs to Bass Lake.

Age: 40 adults (44%), 32 seniors (36%), 12 kids (13%), and 6 (8%) young adults.

Gender: 49 (54%) females and 41 (46%) males.
Trail use: 94% stayed on the trail, while 6% went off trail.
Time: 61% came during the day, 21% came during the morning, and 18% came during the evening.
Weather: 48% came during cool, 43% came during nice weather, and 9% came during cold, rainy conditions.
3.1.3 Correlations
Some correlations were found in the observation data. On Rough Ridge, age is a factor in leaving the trail, with younger people being the most likely to go past the boundaries.

When factoring in weather, people are most likely to leave the trail during cloudy weather (perhaps because so few people are up on the trail at that time). People are less likely to leave the trail during good weather (perhaps because the presence of other people serves as a behavior inhibitor. People are least likely to leave the trail during moderate weather—a fact that is difficult to explain.
At Bass Lake, pets were more likely to be leashed as the age of their owner increased.

### 3.1.4 Discussion

In general, we observed relatively few problems. However, some trends were apparent in the observations. First, many of the visitors left the trail on Rough Ridge to take pictures, presumably so there would be no railing in the photo for a more “natural,” on-the-mountain-top look. Most of the dog-walkers on Bass Lake kept their animals on leash, but at times this caused the dogs to be more agitated (pulling on the leash, lunging) when approaching other dogs. Animal droppings on the trail were noticeable, especially along the dam where horses are allowed. The Bass Lake trail was highly congested most of the days, but especially on weekends. In general, most of the problems observed appeared to be related to a lack of information: not understanding why walking on rocks damages the ecosystem, not knowing the location of other trails to alleviate congestion, not respecting the desire of others to have a quiet experience on the trail.

### 3.2 Interviews

In the winter/spring, when trail use was decreased, the students decided to make phone calls to rangers at other parks around the country to gather more data. It was our hope that these rangers would be able to provide us with insights that would help us identify criteria for successful interventions, as well as possible mitigation plans. Using grant funds, we purchased two pay-as-you-go cell phones for the students use. We also purchased two digital recorders, so that students could record the conversations (with the rangers’ permission) by using the cell phone in speakerphone mode.
### 3.2.1 Call logs

<table>
<thead>
<tr>
<th>Problem/Conflict</th>
<th>Why a Problem</th>
<th>Causes</th>
<th>Examples</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-trail conflicts: 70% of parks contacted had problems with Social Trails &amp; Trail-b blazing.</td>
<td>Trail blazing and social trails through protected areas have caused environmental issues such as erosion, damaging plant life and interfering with wildlife. Both tourists &amp; locals are giving some parks trouble. Natchez Trace Parkway has trouble with tourists “going off trail onto people’s private property” and also reports “Some homeowners have encroached on the parkways.”</td>
<td>Trails don’t go where people want them to go or they are too hard or strenuous to navigate.</td>
<td>Denali National Park reports “people cut their own trails-most cases, where they have problems, the trails are not well designed” Natchez Trace Parkway reports they do not use many signs due to upkeep and “scarring of scenery”</td>
<td>Denali National Park is dealing with this issue by “designing new sustainable trails” reports Trails Supervisor Chuck Tomkiewicz. A good design for trails “encompasses whether people are willing to use it, and it also has to be sustainable in a heavy weather event and heavy traffic, not causing erosion” George Washington Memorial Parkway initiated a Task Force for one of their most high volume trails, Mount Vernon Trail. “The park designed a new sign plan for the trail, we increased our volunteer trail patrol and we increased ranger presence on the trails” reports Ranger Peter McCallum. Education: on trail etiquette, safety, &amp; what to expect on the trail. Increase volunteer or Ranger presence on high traffic trails. Closing trails or areas during nesting/breeding season. Deal with property issues one-on-one Local outfitters know &amp; explain rules.</td>
</tr>
<tr>
<td>Problem/Conflict</td>
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<tr>
<td>Horses v. hikers v. mountain bikers v. climbers</td>
<td>Overcrowding can cause people to go off trail</td>
<td>Horse trails not well marked.</td>
<td>Joshua Tree National Park reports having problems with rock climbers leaving the trail and trampling through plant life to get to a rock face. “There are not always enough rangers to stay and patrol”: Joe Zarki, Chief of Interpretation of Joshua Tree National Park.</td>
<td>&quot;Education, education, education..... Visitor contacts, we use signs in areas/cases and local outfitters know and explain the rules,” explains Gary Stellpflug, Trail Foreman from Acadia National Park. Education on trail etiquette and what to expect during the hike. Putting up signs. Increase volunteer or Ranger presence on high traffic trails.</td>
</tr>
<tr>
<td>Wildlife &amp; plant life disturbance</td>
<td>Damages &amp; can kill precious wild life and plant life Preservation areas are not providing intended security for wildlife.</td>
<td>Social Trails and Trail blazers. Lack of education on urgency to maintain wildlife preservation areas.</td>
<td>Daniel J. Cloud, Facility Manager of Bryce Canyon National Park: &quot;Day hiking offers a few natural water sources, rock climbing, and 20% of visitors rock climb, usually off trails, sometimes on not approved trails, where they walk over plants etc. and it is hard to recover those areas.&quot;</td>
<td>Acadia National Park has “some seasonal closures for falcon breeding or other wildlife issues” states Trail foreman Gary Stellpflug. At Denali National Park, &quot;if we need signs to keep people out of an area, we have signs that say 'Restoration area-please help us in restoring this area that was disturbed by people’s impact, by keeping out of this area” explains Chuck Tomkiewicz, Trails Supervisor.</td>
</tr>
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</tbody>
</table>
| Littering        | Environmental problems, visually displeasing | Picnic areas at park  
Carelessness | Volunteers pick up trash at Everglades National Park.  
No food allowed on trails  
Increase Ranger and volunteer presence  
Offer more trash receptacles |
|                  |               |        |          |           |
| Pet conflicts    | Aggressive behavior  
Dogs off trail  
Pet waste is dangerous for wildlife & children | Dogs on a leash are more aggressive  
Dogs off leash damage plant life  
Owners do not pick up waste | Everglades National Park, decided not to allow animals on the trails, "Only in the parking and picnic areas now. Pets create a problem with wildlife on the trails," states Samantha Edwards, Telecommunicator  
Designated areas for dogs  
No dogs allowed at park  
Leash Required rules |
4 Interventions

From the observation and phone interview data, we drew up a list of potential interventions, and then ranked them based on the following criteria: persuasive/informative; low cost; appropriate appearance, minimal impact; simple, easy, & quick implementation; proven effectiveness; and fit with NPS policies. For the last two criteria listed, we did not always have enough information to rank the strategies. See Appendix C for examples of these ranking tables.

Based on our rankings, we propose that the Parkway focus its efforts to reduce trail conflicts at Rough Ridge and Bass Lakes in three ways: improving the signing, increasing educational outreach, and making two more significant physical changes.

4.1 Signs

To increase visitor awareness about the fragility of ecosystems, trail etiquette, and other topics, which should increase their compliance, we recommend the production of kiosks and the update and modification of previously existing signs. New kiosks should include the following information:

**Rough Ridge**
- Leave no trace practices
- Increased info on plant fragility (to give people a stronger reason to not leave trail)
- Notice about no dogs
- Trail “endangered” status (to inform people that trail may need to be shut down, which would give one more compelling reason to comply with signs to not leave trail)
- Other nearby trails (to reduce congestion)
- Closest facilities (to reduce some off-trail activities)
- A focus on pictures (for faster intake of information)

**Bass Lake**
- Leave no trace practices
- Leash laws
- Litter (parenting tips, e.g. make picking up trash a scavenger hunt)
- Bags/trash container locations
- Other nearby trails/map of Cone trails
- Fishing rules
- Walking lanes/days of week
- Suggestion box
- History of Cone Manor
- “Thanks” signs around lake to encourage compliance

Ideally, kiosks would be placed at the parking lots of both trails. A 8-sided kiosk, such as the one at the Craft/Visitor center in Asheville (a similar structure is pictured below), would seem to be most
appropriate. ASU students in service-learning courses, or members of the ASU chapter of the Friends of the Parkway, could build the structures, and other students in service-learning courses could create the flyers and informational materials.

Some of the signs in both locations are either misplaced, completely worn down, or not sufficient in explaining trial issues, rules, or the fragility of the flora that is nearby these signs. Some have been damaged by the elements, and could be interpreted as outdated warnings no longer enforced. The solution to this problem would be new/updated signs.
4.2 Educational Materials
One cause of trail conflict is the lack of information regarding trails and proper trail use. The distribution and placement more and better information could prove useful in resolving many of the conflicts by placing the responsibility on visitors. Thus, we recommend that inexpensive educational materials be produced and distributed. These could be placed on small 1/3 sheets of paper, and created/produced by service-learning classes at ASU. Information that could be put on these materials include:

- More detailed information about ecological fragility,
- Leave no trace practices,
- Trail courtesy,
- Dog leash laws and courtesy practices,
- Maps of other trails,
- and other topics.

These small flyers could be distributed in the following ways:
- On the kiosks,
- In racks on countertops of Blowing Rock restaurants/B&B’s,
- By members of the Parkway Corps while on Rough Ridge,
- At area outfitters (Footsloggers, Mast Store, etc.),
- To ASU clubs and classes,
- and other outdoor-activity focused locations and groups.

Informing area clubs, outfitters, and other groups with a stake in maintaining the trails should create a ripple effect. Such “opinion leaders” would talk to other people about the issues, and increase awareness through word of mouth. Furthermore, this is non-aggressive approach that may be seen as more friendly and inviting. People tend to be more willing to follow rules and courtesies if they are treated with courtesy as well.

4.3 Physical changes
In addition to these relatively inexpensive and simple interventions, we would also suggest that the Parkway consider two other physical/structural changes to the two trails: the creation of a photo opportunity spot, and a dog park.

As noted earlier, most visitors who leave the trail at Rough Ridge were observed to do so in order to take a picture. The video clip we showed in our presentation showed one example of this, and we observed many other people taking pictures of themselves out on a rock. In particular, the rock near the beginning of the boardwalk (see picture below) was extremely popular with people seeking a “mountain photo,” due to its easy access, the large exposed rock, and the profile of Grandfather Mountain in the background.
It is our belief that if the park service were to designate this area as a “photo op spot,” opening up the barrier at that point and creating a short walkway out to the rock, people would limit their off-trail excursions to this one area. Of course, an assessment of the plant life here would need to be conducted, but it might be most effective to “sacrifice” this one area to ensure the protection of other locations. This spot would be an optimal location, not only due to its picturesque quality (already appreciated by visitors), but also because the rock is nearly free of vegetation and has a significant enough drop-off on all sides to discourage people from continuing to explore off-trail.

Photo Op Location

Drop-off on back side

Possible location for short bridge to rock
Information about this photo-op spot could be provided at the kiosk at the Rough Ridge overlook parking lot. Creating this photo-op spot would have the additional benefit of demonstrating the seriousness of the problem to visitors, as well as the goodwill of the Park Service. It would also make concrete and visible the dual mission/dilemma of providing current visitors with the positive experience they desire while simultaneously protecting the resources for future visitors. As such, the photo-op spot could serve a very real educational purpose as well.

Our other physical/structural suggestion also has the potential to serve practical, educational, and visitor-pleasing functions. At Bass Lake, some of the crowding/refuse/lunging problems with dog walkers could be alleviated through the creation of a dog park. As some state parks have learned, dogs off-leash in an enclosed park area are less aggressive. In addition, a dog park is valued by the human visitors, since it gives dog owners a chance to both exercise their dog at even higher levels, as well as a chance to socialize with other dog-lovers. People who do not own dogs would appreciate the reduced congestion/refuse on the trail, as well the lowered concern over aggressive dogs on the trail.

Bass Lake has a seemingly ready-made location for a dog park. On the manor side of the lake are two fish-raising ponds. Between this and the manor is a pasture with a hill-side that could be converted into a dog park with relative ease, replacing the existing fencing with something more appropriate for dogs.
Certainly a significant amount of additional research would be needed to make the dog park a reality. But we believe the benefits would be worth it. In addition to the benefits to visitors mentioned above, the Park could receive rewards from this as well. A fee could be charged for use of the dog park (either per visit or an annual pass) — other parks have done this through the use of a coded gate, which the visitor gains access to after paying the fee. The additional goodwill and positive public relations would also serve the Park well, as it would improve interactions with the community of Blowing Rock (a relatively wealthy community with the potential for substantial donations).

5 Conclusion
The conflicts we observed at Rough Ridge and Bass Lake were less severe than we expected. Nevertheless, some level of mitigation is needed to preserve both the natural resources as well as the visitors’ experiences. Building kiosks and distributing more educational materials are relatively simple strategies that could have a large impact for their low cost, especially if volunteer labor is used. ASU’s Parkway Corps, Friends of the Parkway, and service-learning courses are all excellent sources of volunteer resources that should be taken advantage of.

The larger-scaled interventions — the photo-op spot and dog park — will require more resources and research to be made a reality. However, there projects have the potential for extremely great impact, especially since their successful completion could serve as a model for other parks. The Parkway Research Course is excited that we have laid the groundwork this year, and we hope that the next two years of this project are able to put these plans into motion.

Thank you for this opportunity to serve the Parkway.
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