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Statement for the Record
Senate Subcommittee on National Parks

September 27, 2017

Chairman Daines, ranking member Hirono and members of the subcommittee, thank you for inviting me to appear before you today. I was asked to testify about attracting younger generations to our National Parks. I will do so based on my experience a.) working and investing in technology startups for 20 years, b.) providing broadband Internet coverage to millions of young people, usually in very remote locations, and c.) as a visitor of the parks for over 40 years. Young people today expect to engage with the world through rich online media experiences, and expect to be able to create and share their own content, in real time. Today, most parks make that all but impossible due to lack of broadband connectivity in highly visited frontcountry areas. This reduces the parks' ability to engage with visitors before, during and after people visit, further risking alienating the future of park advocacy. The solution is to streamline the adoption of innovative business models in broadband connectivity and media engagement to close that digital gap in the parks, fostering long term relationships with its patrons.

The Current State of Online Media

Social media has significantly changed the way we interact with others, with the world around us and the way we consume and create content. A few statistics:

- 86% of 18-29 year olds use social media
- 81% of millennials check Twitter at least once per day. Two-thirds of adults do as well.
- 9,000 photos are shared every second on Snapchat
- YouTube reaches more 18-34 year olds than any cable network in the US
- Katy Perry has 94 million Twitter followers. The National Park Service has 457,000
- Blogging on WordPress reaches 409 million people per month

Real-time communication among millennials can occur only in areas with broadband Internet connectivity. Where older generations lived and thought in terms of days or weeks, these young people think and act in real-time, over the Internet, on the order of seconds. They are hyperconnected to their friends and family, wherever they go, and unless an experience is shared with others it was not truly experienced. Traveling to a place with no Wi-Fi would be asking much of these citizens, as this essentially asks them to change how they interact with the world. The parks have an enormous opportunity to lure an increasing number of younger visitors to the outdoors, introducing them to rewarding experiences and eventually enabling them to build long term relationships with the parks.

Travel technology is trending toward educational media and augmented reality, dramatically raising the stakes in broadband internet requirements. Augmented reality is present in an increasing number of mobile apps, offering the parks an incredible opportunity for visitor engagement. One can imagine two layers in the world around us; the visible physical layer and the data layer.   Users are increasingly able to view physical landscape through the screen of their mobile phones, witnessing superimposed information about what they are viewing. For example, this technology allows an individual the opportunity to learn the names of peaks and valleys, see measurements next to a Sequoia tree, view reconstructed images of buildings that existed in 1912, or see the location of a trailhead superimposed on a mountain. Above all, millennials crave an immersive experience, rich in information and visual content. Whereas John Muir was able to immerse himself in the wilderness for months at a time without interruption, younger generations choose a different immersive experience. Having limited time, they want to find, experience and share using all technological means available, adding content as they travel. This real-time content can then be shared with friends and families back home, or other nearby visitors. The parks have an opportunity to shape the conversation, and form long term relationships with millennials as never before. One can confidently assume Yosemite Falls offers a more fulfilling experience than Katy Perry tweets, but these young people must first be lured to the parks to understand that.

Digital media has the potential to influence a generation, and to spur funding for park infrastructure for decades in the future. Young taxpayers visiting the parks are our best source of marketing and advocacy.   If a millennial sees live, high

definition video of Yellowstone Falls or a campsite in Death Valley it enriches their understanding of travel opportunities. Sharing of this new understanding with their network also influences others to form dynamic relationships with the outdoors. "Cool" is the future of the parks, although that individualized content is something only they can create. Media engagement is only possible with broadband infrastructure that does not currently exist in most parks.

The Problem

Urbanization of the US population increasingly results in young people cut off from a magnificent legacy that they don't realize exists. Job opportunities and attractive technology in urban areas will drive this trend for the foreseeable future, increasing isolation from the wilderness. Millennials spend an average of 9 hours per day on social media, and many don't hear about the parks from their friends on these networks. There has been little opportunity to engage with the national parks in the language they understand.

Having traveled the national parks extensively in an Airstream trailer, lack of broadband connectivity has many times prevented my family from staying in the park for more than a day or two. A growing number of young professionals, up to 30%, are Independent Workers. These are software programmers, "creatives" and even lawyers and doctors who work while traveling. Even the typical office worker has difficulty in today's economy being away from connectivity for a weekend, as employers increasingly expect workers to be available at all times. With improved technology, we have an opportunity to save these people from the cubicle; to introduce them to the outdoors, and then engage with them for a lifetime.

Today the parks are an information black hole; in technical terms of download and upload speeds, little information is allowed in, and even less allowed out. What media content does exist online is typically stored on a mobile device's hard drive, and then uploaded when outside the park. However, millennials expect to communicate in real-time. By the time they have left, many have moved on to the next experience and the media remains locked in the device forever.

Backcountry areas are visited by a tiny fraction of visitors, and will likely be disconnected for some time, as they should be. There are those who would also seek to keep the frontcountry areas of the parks sealed from the outside world.

These park advocates' motivation is certainly coming from a good place; many of us wish the only way to get to Yosemite Valley was still by horseback. In the first few years of the parks' existence organizations were formed to "preserve the primitive" and stop roads from being built in the parks. However, the first National Park Service Director, Stephen Mather, won the argument. Moving forward, he hired artists to oversee road construction ensuring roads would blend in with the scenery. By engaging in savvy marketing and building new access, Director Mather tripled visitation from 1 million to 3 million visitors per year. Few today would prefer that the beautiful scenery along the Going to the Sun Road in Glacier National Park was not available to millions of visitors every year. Broadband connectivity can be viewed as an analogy to Mather's roads, as it allows the same opportunity for impact, bringing a new generation of long term park supporters into the fold. Additionally, this does not require digging up the landscape, or the use of appropriated funds. There exists an opportunity to shape the boundaries and terms of online relationships now, similar to how Mather shaped the physical boundaries of the early parks.

The Solution

Director Mather said that the parks were the schoolroom of Americanism. However, park rangers who act as teachers cannot be everywhere, and especially not outside the parks. Technology can be a virtual park ranger for those who don't have the opportunity to meet one. As we embrace a new era in park interpretation, moving from scenery to information, technology can be used to leverage engagement and park stewardship. Continuing a process that began in the 1930s, an opportunity exists to realize a greater potential for the parks with the technology we have today. Leveraging location based services allows for the resolution of park logistical challenges by implementing efficient use of green public transportation and crowdfunding for infrastructure. Incorporating "Big Data" analytics to manage traffic flow can resolve overcrowding at peak times. Access to information about parks will encourage visitation to less crowded areas. Social media also allows us to see which visitors are experiencing which parks, allowing the parks to tailor engagement and information accordingly.

Millennials want immersive experiences, and they are open to engagement on any media platform. John Muir stayed for months in the wilderness, and had

experiences most of us can only dream about. Today we can understand with increasing depth the massive amount of information and media pertaining to the wilderness. Muir wrote 300 articles and 12 books, all of which are now available with one click, if one has Internet access. Technology will bring more young people, but its greatest benefit is that it will allow every visitor to experience the parks in their own way. Visitors will come away with a deeper understanding of what they have witnessed, more so than any previous generation. Far from diminishing nature, information can be an enriching overlay to the physical. Imagine millions of park evangelists online, talking about what they learned, many of them influencers to millions more.

Infrastructure exists today to achieve broadband connectivity in every park's frontcountry, with no new construction. Solutions include a low-footprint combination of pre-existing telecom towers, wireless microwave and Wi-Fi technologies, having virtually no negative visual impact for visitors. At Lake Mead National Recreation Area, our public-private partnership is providing broadband Wi-Fi to a 250 square mile area that previously had almost no connectivity. Visitors, concessioners and employees have responded with enthusiasm.

Once there is frontcountry connectivity, public-private partnerships can unleash innovation by thousands of smart, passionate entrepreneurs around the country. These entrepreneurs will build innovative solutions; alleviating congestion, providing augmented reality overlays to the physical world, building multilingual guides, driving traffic to less-visited parks, reducing seasonality by building electrical service in frontcountry campgrounds, and any number of other applications we can only speculate about. National Park Service culture should embrace the innovative mindset of Director Mather, as well as the tolerance of failure that innovation requires. Mather's experiments with attracting visitors included failed projects such as building a zoo and even a racetrack in the parks, but also allowed new successful infrastructure such as the Going to the Sun Road and 1,600 miles of telephone/telegraph lines. Today, 100 years later, connectivity has barely progressed beyond Mather's time; real-time road conditions are still only available by those telephone lines in many parks.

I am a spiritual disciple of Muir, but a pragmatic follower of Mather, who understood the power of innovation and engagement to bring future supporters

to the parks. Without new visitors who are touched by the parks they will inevitably be eroded, and parks are one of our most important contributors to a common identity as Americans. Foreign visitors are in awe of the parks as well, understanding that they are a symbol of our democracy. In the parks, we all reach common understanding of what is great in the world, regardless of politics or identity.

John Muir once said that the written word was "a weak instrument for the reality I wish to convey". One must wonder what he would say if he witnessed Instagram's ability to inspire millions with a photo at the touch of a button. Today the parks have new, powerful technology instruments with which to engage Americans, and the opportunity to shape the conversation with millions of future park advocates. All that is required is the will to enable progress and innovation.