



Introduction:

The National Park Service (NPS) is tasked with protecting natural resources within the National Park System, including air quality. The National Park Service Organic Act of 1916: Created the NPS and directs the NPS to conserve the resources and values of parks in a way that will leave them "unimpaired" for the enjoyment of future generations. Bryce Canyon was established as a National Monument in 1923 and in 1928 Congress passed the Park's enabling legislation that recognized the "unusual scenic beauty" of the park. Under the 1977 Amendment to the Clean Air Act, Bryce Canyon National Park (BRCA) was designated a Class 1 Area. This designation bestows an "affirmative responsibility" on the National Park to actively protect the air quality and resources sensitive to air pollution within the park.



Mosaic Intern Gives Air Quality Program

Until 2015, the park did not have an Air Quality and Visibility interpretive program. To address this gap in interpretive information a Mosaics intern was hired to develop and present pilot interpretive programs focused on Climate, Air Quality, and Visibility in the park. The intern was also tasked with collecting data from the Air quality equipment in the park and providing any maintenance necessary.

Additional duties included:

- Communicated with both the IMPROVE program office to agree on mitigation measures for a water tank painting project in close proximity to monitoring equipment.
- Watch for severe weather and provide information to the front desk of the visitor center as to protect the safety of the visitors.
- Assist the physical scientist at the park in reviewing a Supplemental Draft Environmental Impact Statement (SDEIS) concerning a proposed Lease by Application on a coal tract 10 miles southwest of the park.
- The Mosaics intern also hosted interns from Cedar Breaks National Monument to help establish a new citizen science initiative.



Image represents the view from Yovimpa point 20% clearest days



Image represents the view from Yovimpa Point 20% haziest days

Park resource:

Bryce Canyon National Park protects and conserves resources integral to a landscape of unusual scenic beauty exemplified by highly colored and fantastically eroded geological features, including rock fins and spires, for the benefit and enjoyment of the people.

Visibility in Bryce Canyon is protected as the most sensitive Air Quality Resource Value (AQRV) by law, and through the State of Utah's State Implementation Plan. The Clarity, color, and detail of visible features are also important in addition to the range at which a visitor can see.

Bryce Canyon continually monitors the Air Quality, and visibility in and outside of the park to preserve and protect the Integral vistas.

Bryce Canyon is susceptible to actions and events of the surrounding areas, including prescribed fires and wildfires. On June 18th and 19th 2015, Bryce Canyon's visibility was dramatically reduced as a result of the Lake Fire in California. Winds transported the particulate matter from the estimated 13,000 burned acres to Southern Utah.



Broad view of Southwestern United States and parts of Mexico, showing path of Lake Fire smoke. Acquired Thursday, June 18, 2015 by NASA's Aqua satellite. (source: NASA Worldview)



Image represents view from Yovimpa Point, June 18th, 2015

Data Collection:

To establish a base understand of the Air Quality, Visibility, and Climate of Bryce Canyon:

- Research about the Air Quality Related Values of Bryce Canyon National Park was conducted
- Research of the Air Quality history in the park and how it has changed over that time was conducted
- Research of the measures that have historically been taken in the park to improve and address the Air Quality, Visibility, and Monitoring systems in the park was conducted.

Continued maintenance and collection of Air quality related data was continually collected at the park.

- -Precipitation samples were weekly collected and prepared for analysis from the NADP/NTN monitoring site located within the park.
- Particulate Matter samples were weekly collected and prepared for analysis from the IMPROVE site located in the park.
- Monthly Precipitation data from the NOAA sponsored Rain gage located in the park was collected.
- Photographs were collected from a monitoring camera at the southern end of the park. And photographs were taken from park personnel cameras to incorporate into interpretive products.

All collected data is used by the park to understand our Air Quality, Visibility and climate in the park to help adhere to our Class 1 area status and to aid in conveying information and science.



Mosaic Intern Collecting NOAA Rain Gauge Data



Mosaic Intern Collecting NADP/NTN sample

Interpretation:

Using the data and research collected three interpretive products were produced which are focused towards the topics of: Air Quality, Visibility, and Climate.

Ranger/Volunteer Program (15 min) - A Ranger/Volunteer program focused on Visibility and Air Quality in the park, given Rainbow/Yovimpa Point (southern end of park) where the scenic vistas are most expansive. Interpretive Program was cleared by the interpretive staff and counts towards one of the requirements for Junior Rangers.

Evening Program (30-40 min) – Produced was a more extensive PowerPoint presentation focused on Air Quality and Visibility in the park. Going deeper into the science behind haze, visibility, and light the program is presented in the evening at the Bryce Canyon Lodge auditorium. Cleared by Interpretive staff, the talk fulfills one of the requirements for Junior Rangers

“Shuttlebus” talks (2-3 min) – Created were short 2 to 3 minute talks about a single topic in the park related to Air Quality, Climate, and Visibility. Each is about a small aspect of their respective topic and designed to be short and concise allowing for the visitor to ask questions if they further want to learn more or not; designed to be given on the shuttlebus in Bryce Canyon or on the trail when encountering visitors. In an emergency a number of the short talks can be put together as a short ranger talk.



Air Quality Monitoring Station BRCA



IMPROVE Particulate Matter station BRCA

Discussion:

The Mosaics intern successfully completed the interpretive programs supplying the park with new material to be used as the focus of future interpretive programs. Each program was met with positive feedback from both visitors and park staff. Air Quality samples were collected including the collection of NADP/NTN and IMPROVE samples and downloading data from the NOAA rain gauge. IMPROVE and Park staff have agreed on mitigation measures for a water tank painting project that is projected to start in the near future near monitoring equipment. Park staff will be using collected data from the Air Quality monitoring site and photography in their interpretive programs when communicating to the public about Air Quality, Visibility, and Climate. The camera at Yovimpa Point (southern end of park) is now being funded and will be on the NPS Air Quality Web Camera network open to the public. When severe weather was present park staff at the front desk of the visitors center were notified and advise to advocate safety to the visitors. Mosaic intern volunteered in conducting evening astronomy programs. The public comment period for the Coal Tract Lease by Application SDEIS has passed. Park staff was informed of what was written in the SDEIS and a public meeting was attended by Mosaics Intern. Park staff will now use the pilot interpretive programs and begin presenting them to visitors. Mosaic intern assisted as a member of the search and rescue team at Bryce Canyon, in carrying out injured visitors.

References:
 Garrett, County of New Visibility. (n.d.). June 2015. Available: "Introduction to visibility." n.d., Park, Bryce Canyon National Monument. Available: The History of a Century. 2013. Newspaper. Utah, and New York history. State and National 2012. Newspaper. Utah Department of Environmental Quality. Utah Department of Environmental Quality. Division of Air Quality. 2012. State of Utah. Utah, n.d. Available: William B. Matthews, Nicholas A. Pickett. "Climate Change and Environmental Quality: A Review of the Literature." U.S. Department of Environmental Protection. Division of Air Quality. Environmental Research. Available: "Mosaic Intern" Document. Supplemental to the Final Environmental Impact Statement for Publication. 2014. Available.

