Information Briefing
National Park Service/Department of the Interior
Mount Rushmore National Memorial
Fireworks - December 20, 2017

Overview
The National Park Service (NPS) conducted an annual Fourth of July fireworks demonstration at Mount Rushmore National Memorial (Memorial) between 1998 and 2009. The event was canceled in 2010 due to high fire danger. After 2010, additional concerns were identified relating to public safety, visitor access, and chemicals being found in groundwater. Due to a combination of these factors, the event has not been conducted since July of 2009.

The following provides information on a range of topics that should be evaluated and considered prior to making any decision to restart the event. While acceptable mitigation is attainable in several of these areas, a number of them will require a thorough evaluation of risks, costs, and impacts.

Areas for Consideration and Evaluation
Potential for Wildfire
A minimum of 27 wildfire starts occurred during the events between 1999 and 2007 (1999-1, 2000-11, 2001-7, 2004-2, 2007-6). Events in 2002 and 2010 were canceled due to high fire danger. There are three primary factors that create the high potential for wildfire ignitions during this event. They include: 1) the launch of large aerial shells from the top of the Memorial (500 feet above the viewing level), with varying winds and launch angles, while surrounded by fire prone forest; 2) dry conditions due to moderate to severe drought over the past decade; and 3) increased wildfire fuels associated with tree mortality resulting from the mountain pine beetle infestation.

Considerations:

- July fire danger risk can be high to very high in Black Hills area.
- Despite fire precautions being taken in previous year’s events, fire starts occurred with frequency.
- Expedient wildfire response is challenging due to the topography around the Memorial.
- NPS relied heavily on assistance from state and local resources to supplement NPS response capacity. Continued availability of those resources would need to be determined.
- Moderate to severe drought conditions have persisted along with a substantial mountain pine beetle infestation in the area, potentially exacerbating wildfire risks.
- A wildfire escape could have devastating consequences on surrounding communities, private land owners and NPS infrastructure at the Memorial.
Public Health, Safety and Visitor Access

The event was enjoyed by thousands of people annually and grew substantially in popularity each year. The visitor capacity of the Memorial at any one time is approximately 8,000 people. This number is based on an assessment of capacity of wastewater facilities, restrooms, transportation, and other factors. On average, visitors stay at the park for two to three hours translating to an estimated 34,000+ people who visit the Memorial over the course of an entire day.

On the day(s) of the fireworks event, capacity was typically reached by 9:30 a.m., as people arrived early to obtain the best viewing spot for the evening. Once capacity was reached, thousands of visitors were turned away from the Memorial.

The Memorial is accessed by one, two-lane road that traverses the south/western portion of the boundary. Designated NPS parking areas can accommodate 1,172 vehicles at any one time. On the day of the event, designated parking areas filled quickly and overflow moved to the shoulders of the road where an estimated additional 1,500 cars parked. This caused substantial traffic hazards, gridlock, and made it difficult for emergency vehicles to move through the area. Fire starts from fireworks in 2000 and 2001 required closures of the road, affecting the only evacuation route.

In 2004, fireworks debris fallout (particles and spheres of powder, plastic, and fiberglass shell components) accidentally showered spectators seated in the viewing area below the Memorial, resulting in excess of 50 individuals needing treatment by emergency medical services for foreign matter in their eyes. All were treated on site; no one was transported to the hospital. This incident appears to have been a result of a wind shift. In retrospect, it appears NPS may have been out of compliance with certain best practices relating to recommended safe distances for spectator viewing.

Premature fireworks detonations were documented during several years of the event. One year, approximately 50 shells detonated prematurely. The launch site is only accessible by helicopter and/or substantial hiking over rough terrain. Any injury sustained by personnel would be difficult to evacuate expeditiously, especially in darkness. Additionally, the launch site used for fireworks was substantially smaller than recommended, potentially increasing the risk for injury and/or death in the case of a mishap.

Considerations:

- The fireworks launch area previously used was too small to meet minimum safety requirements. Either a larger area would need to be identified, or a smaller number/size of fireworks used.
- Minimum safe viewing distance would need to be re-evaluated to improve spectator safety below.
- Better planning and execution of traffic management would be necessary to ensure access and evacuation routes remain open during the event, including reducing the numbers of vehicles allowed to park in undesignated areas.
- A significant number of visitors (thousands) could be turned away once the Memorial reaches an identified safe carrying capacity.
- Improve injury/emergency evacuation planning in the viewing area and at the launch site.
Perchlorate in Ground Water

Perchlorates were first detected in soils, surface waters and groundwater at the Memorial by USGS in 2011. The only known source for perchlorates at the Memorial is the fireworks that were used since 1998 (see USGS information memo). Perchlorates are an oxidizing agent commonly found in fireworks. Other metals and contaminants are also present in fireworks, but perchlorate is known to persist in the environment.

According to the USGS report, past firework events appear to be the probable source of perchlorate contamination in drinking water at the Memorial. Perchlorate in drinking water is not currently regulated by the Environmental Protection Agency (EPA), but is on the EPA Contaminant Candidate List 3, and an interim EPA Health Advisory was set at 15 µg/L. Drinking water is provided to about 3 million visitors to the memorial every year and to year-round park personnel. The water supply at the Memorial is served by two groundwater wells, and perchlorate concentrations in the groundwater exceeded this Health Advisory level when tested between 2011 and 2015.

Considerations:
- Further determine whether the levels of perchlorate detected pose any risk to humans or the environment.
- Determine whether the USGS findings, connecting fireworks to perchlorates, would trigger any actions under the National Environmental Policy Act prior to restarting.
- A prior environmental assessment conducted in 2004 did not take into consideration effects of perchlorate on groundwater and was primarily focused on wildfire considerations.
- Evaluate better practices for fireworks demonstrations—including use of fireworks with lower to zero perchlorates where feasible. Shells can be ordered with less or no perchlorate, but are more costly and less impressive (color may not be available).

Sculpture

NPS has spent approximately $1.5 million on repairing cracks to the sculpture since 1998. Repairing these cracks are part of a normal and routine maintenance program and are not directly attributable to fireworks. There have been concerns that concussions from larger mortars could negatively affect the sculpture. NPS could find no direct evidence or link between ignition of fireworks and cracking of the sculpture.

Considerations:
- Since the fireworks are detonated at the top of the Memorial, NPS should achieve a higher level of confidence that concussions from large aerial explosions will not damage the Memorial or exacerbate/accelerate cracking.

Costs

Cost estimates for the event each year ranged from $200,000 to $500,000+ for incident management, additional firefighting/law enforcement resources, clean up, etc. The costs associated with the fireworks contract (actual fireworks and launching) was approximately $75,000-$100,000 and was sponsored by the Mount Rushmore Society (Society). During the early years of the event, NPS relied heavily on supplemental (free of charge) fire and emergency response resources of local communities. This assistance substantially offset costs that would have otherwise been higher. In later years, as the event became larger and required more resources, local agencies continued providing support, but began inquiring about reimbursement for services. It is unclear whether communities would still be able to
provide supplemental services due to costs and resource availability. For context, the normal two-day costs for NPS operations at the Memorial in July (without the event) are approximately $18,000.

Considerations:

- Costs are estimated at a minimum of $100,000+ for the fireworks contract and anywhere from $200,000-$500,000+ per year for other costs associated with managing the event.
- Availability of local fire, law enforcement, and EMS resources is uncertain potentially elevating costs.

**Economic Impacts**

According to the South Dakota Office of Tourism, the State has continued to see record tourism spending since 2010, much of which is within Pennington County where the Memorial is located. Visitor spending increased 12.5% in 2010 from 2009 when the fireworks event was last held. Since 2010, the State also reports seven straight years of economic growth. Visitation to the Memorial in 2009 was 2.2 million compared to 2.3 million in 2010, and a drop to 2 million in 2011. Visitation in 2015 and 2016 was 2.4 million in both years (highest on record).

Considerations:

- Television coverage during the event provided substantial positive exposure for the Memorial and the State.
- The State’s visitor spending numbers do not show a decrease in tourism or tourism spending year-to-year after the event was cancelled.
- The State’s economic numbers (and Pennington County’s) have grown dramatically since 2009.
- Local economies may benefit more from having visitors dispersed throughout July 4th rather than having only a limited number of people being able to reach the Memorial during the event day.
- Gridlock and traffic closures may actually dissuade visitors from traveling to the Black Hills.
- The Memorial’s concession revenues increased by 345% from 2009 (with fireworks) to 2010 (without fireworks) when comparing the July 3 and 4 data for each year.

**Summary of Actions to Be Evaluated**

**Fire Management:**

- Determine whether local/state government emergency response capacity is available to supplement/support NPS operations.
- Ensure surrounding communities, private land owners, and land management agencies (state and federal) understand the risks associated with increased wildfire potential from the event.
- Continue working to reduce fuels within, and around, the Memorial.

**Public Health and Safety:**

- Evaluate options to shift the viewing area outwards to ensure spectators are not in danger from falling debris. This would potentially substantially reduce the number of people able to view the demonstration, but would improve viewing safety.
- Evaluate human safety conditions at the launch site ensuring that the size and configuration is adequate for the types and numbers of fireworks launched.
- Evaluate traffic congestion and gridlock concerns, especially relative to emergency response and egress.
- Evacuation planning, both for the viewing area and launch site.
Environmental Contamination:
- Determine NEPA requirements relating to the nexus between fireworks and groundwater contamination identified by the USGS.
- Consider using more expensive fireworks with lower/no perchlorate.
- Evaluate best management practices that exist in many states for fireworks, including methods of reducing perchlorate contamination.
- Continue monitoring soils and surface/groundwater for perchlorate levels.
- Determine if risks are mitigatable to an acceptable level.

Sculpture:
- Determine whether there is an actual nexus between fireworks and increased cracking/damage of the sculpture.
- Mitigate any potential launching or igniting of fireworks directly on, or in the direction of, the sculpture.

Costs:
- Determine cost estimates based on adjustment/actions listed above.
- Determine if the Society is willing to continue funding the purchase of the fireworks contract.
- Evaluate both positive and negative economic impacts of restarting the event.

*Environmental Assessment Conducted in 2004*

In 2003, an Environmental Assessment (EA) was prepared to evaluate the Mount Rushmore National Memorial July 4th Holiday Fireworks Program. The document evaluated three alternatives including regular Holiday July 4th celebrations without fireworks, celebrations with fireworks, and celebrations with a laser light show.

The resulting decision memo (Finding of No Significant Impact) was signed in 2004 selecting to continue with fireworks citing the majority of impacts to the environment as temporary and benefits to visitor experience as the basis for the decision. In reviewing the material, perchlorate concerns were not evaluated in the EA. The EA discussed impacts associated with wildfire but did not evaluate certain concerns regarding changing fuel loads or potential limitations of fire response capacity. For the Memorial to re-initiate fireworks, a supplemental EA would most likely need to be completed to address any new impacts and changing conditions identified since 2004. This would be followed by a formal decision document weighing this new information.

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Additional Photos:

View looking down on launch site – NPS Photo
The tops of the President's Heads on the Memorial are to the right

Aerial view of the Memorial

Crowds prior to the event – NPS Photo