



# The 2012 Rock Fall at Warm Springs Rapid

## *A Photographic Documentary*





**ABOVE**

**A new addition to Warm Springs Rapid.  
Photograph: NPS/Peter Williams.**

**ON THE COVER**

**Warm Springs Rapid after the rock fall,  
mid August 2012.  
Photograph: NPS/Stuss Leeds.**

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# The 2012 Rock Fall at Warm Springs Rapid

## *A Photographic Documentary*

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Warm Springs Cliff, August 8, 1935. Note the scars from previous rock falls.  
Photograph: NPS/George A. Grant.

# Introduction

The Warm Springs Rapid that today's river runners know is mostly the product of the huge debris flow that occurred in 1965. Since then the rapid has provided a thrilling ride near the end of an otherwise relatively moderate whitewater river canyon. At higher water Warm Spring's hydraulics can be terrifying. At lower levels precise boating skills are still required to gracefully negotiate the run. It's not unusual for river runners to spend the early days of a Yampa trip trying to enjoy the canyon's spectacular scenery, all the while quietly entertaining a nervous question—what will Warm Springs be like this time? The look and feel of the rapid varies with each change in river flows, and scouting is always the norm, even for those who have run Warm Springs many times before.

**Running Warm Springs at a relatively straight-forward 2,000 cubic feet per second in 2006. The 2012 rock fall deposited substantial debris in this section of the rapid.**  
Photograph: NPS/Peter Williams.

In the summer of 2012 a large rock fall from Warm Springs Cliff significantly changed the topography at the top of the rapid, and there has been much speculation and trepidation

in the months since about what these changes will bring for the next boating season. After news of the rock fall spread in early August 2012, a surprising number of people were motivated to hike in from Echo Park to inspect the results for themselves. The consensus seems to be that the changes will make the rapid more difficult, but until the water comes up in the spring we can't really know. Certainly river runners should approach the rapid with great caution in the future—just as they have in the past.

The purpose of this report is not to provide more speculation about how frightening Warm Springs might be in the future. Rather, it is to provide a brief description and some photographic documentation of what happened at Warm Springs last summer. Hopefully boaters who weren't able to make the journey to the rapid to take a look themselves can now see what all the speculation has been about.





**A:** The “upside-down coke bottle” scar, prominently in view during the last mile-long stretch of river as boaters approach the rapid. This was probably the source of a rock fall in the early 1960s, depositing the large boulders on river left at the head of the rapid.

**B:** An older rock fall scar, visible in the 1935 photograph of Warm Springs Cliff taken by National Park Service photographer George A. Grant (see page 2).

**C:** The source of the 2012 rock fall.

**D:** This scar is on ledges, and appears to have been the result of impacts from the blocks falling from **C**. Some blocks may also have been knocked loose from this section, but its principal contribution to the event was probably the shattering of material falling from above.

**E:** This area appears as a very prominent long, narrow, light-colored rock scar in the 1935 photograph of the cliff, suggesting that it had been the most recent rock fall at that time. It now shows a much more advanced stage of weathering compared to **B**, perhaps because it is in a less sheltered position. The older scar just above and right of it is also visible in the 1935 photograph.

**F:** The area impacted by the 2012 rock fall (see photograph on next page).

An overview of the Warm Springs rapid and cliff, showing rock fall scars and the impact area. This panoramic photograph was taken August 18, 2012, when the Yampa was flowing approximately 90 cubic feet per second. Photograph: NPS/Peter Williams.

# The Rock Fall

Sometime in late June or early July 2012, a section of the Warm Springs Cliff broke away and plummeted into the Yampa River channel below. Drought conditions had reduced the river to just a trickle, and many days could pass between visits by the few hardy boating parties willing to take on the challenges of a low water trip—so we will never know exactly when the rock fall occurred.

landed farther away. Just on the upstream side of the pile of blocks is an obvious impact crater, perhaps 20 feet or more in diameter. It is possible that a single very large block hit here and bounced in a downstream direction while shattering—this would explain why there's nothing presently in the crater big enough to have created such a large feature, and why the majority of the blocks are piled close by.

**Warm Springs Rapid, August 18, 2012. The largest circle shows the crater and the accompanying pile of large blocks. A large accumulation of pulverized debris can be seen between this impact zone and the cliff wall. The two smaller red circles show large blocks that landed farther from the cliff base. Note the area of blasted box elders between the large circle and the smaller red ones. The blue circle indicates the large boulder that creates the major hole in the middle of the wave train during high flows. Photograph: NPS/Peter Williams.**

The source of the rock fall can be clearly seen roughly half way up the 1,700-foot-high cliff face, and for weeks afterward a telltale trail of dust led downward to the destruction below. The falling slabs quickly hit ledges high on the cliff and shattered. The finer material fell straight down into a pile against the base of the cliff, while the larger blocks bounced outward and landed in the middle of the river channel.

The impact of the rock fall created a tremendous blast, which is recorded in the many box elders shattered along the right bank of the rapid. It must also have created an enormous splash. The Yampa was flowing at roughly 200 cubic feet per second at the time, so the water's edge would have been right about where the impact occurred. Apparently the force of the impact was great enough to send ripples through the saturated river bed, liquefying the mix of water and sediments surrounding the river cobbles into a thick goop, and rearranging many of the smaller boulders in the vicin-

The majority of the blocks are piled in a remarkably small area, although a few strays



ity. A wave of the silty mud mixture appears to have traveled outwards from the impact zone, coating the vertical faces of the larger boulders in the area. A distinct high water mark in the mud on the boulders in the river may have come from several small, short-lived increases in river flows in mid July. The huge splash also coated trees and shrubs on shore, with splatters of mud landing hundreds of feet away.

An informal report written soon after the rock fall was discovered by National Park Service employees suggested that there may also have been a small debris flow just prior to the event. Further investigations have confirmed that this was in error. Although significant debris flows did occur at Warm Springs Rapid in 2010 and 2011, none appear to have occurred there in the summer of 2012.



**A close-up of the crater and its contents.**  
Photograph: NPS/Peter Williams.



**Pulverized debris piled at the cliff base. The stripped remains of a box elder can be seen on the ledge at left.**  
Photograph: NPS/Peter Williams.



Above, shredded box elders are visible on the river-right bank just beyond the impact zone. Below, mud coating a blasted box elder trunk. Photographs: NPS/Peter Williams.



Above, mud-coated boulders in the river. Note the high water marks.  
Below, this block landed high on the 1965 debris fan, well over 200 feet from the cliff.  
Photographs: NPS/Peter Williams.

# The Rapid

River runners may be awed by the scope of the destruction from this rock fall, but what draws their focused attention is the large pile of blocks next to the crater. Although high flows will no doubt begin to rearrange these blocks, rolling and settling them farther downstream, they clearly aren't going away soon. The pile is in the section where boaters must pull toward the right shore and break through laterals at the top of the rapid—so as to avoid entering the big wave train on river left with the boat-flipping hole in its middle. Not only might these rocks create a new hole of their own, but they all have very sharp edges just waiting to slice boat tubes. Of course, the location of the laterals and how much time a boater has to pull right always varies according to the river flows—so it's hard to predict just how big a problem this new feature will be.

Perhaps it's small solace for boaters contemplating a future run through Warm Springs, but rock falls are nothing new to the rapid. The cliff face is covered with older scars that must have added many boulders to the river over past millennia. One of these is the prominent "coke bottle" scar, which may have been the source of a rock fall just three or four years before the infamous 1965 debris flow created the modern rapid. In a 1966 letter, Don Hatch wrote that the impact of this rock fall was "as though a fragment bomb had gone off—stripping vegetation" on the right side of the river, and creating "a new and more difficult rapid." Just a few years later the big debris flow down Warm Springs Draw changed everything, and Hatch's "new and more difficult rapid" is now all but forgotten in river lore. The 2012 rock fall may someday suffer the same fate.

**A sharp addition to Warm Springs Rapid.**  
Photograph: NPS/Peter Williams.





**Above, Warm Springs in August 2009, the river flowing at about 200 cubic feet per second. Below, approximately the same perspective in August 2012, at about 90 cubic feet per second. Photographs: NPS/Peter Williams.**



Above, Warm Springs Rapid taken on June 17, 2012, not long before the rock fall.  
Photograph: Robin Rabun, © Garold Fornander.  
Below, approximately the same perspective a month later.  
Photograph: NPS/Stuss Leeds.

**National Park Service**  
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