

Agassiz Glacier

Glacier National Park, MT



1913

*W. C. Alden photo
courtesy of GNP archives*



2005

*Greg Pederson photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Agassiz Glacier

Glacier National Park, MT



1943

*M. V. Walker photo
courtesy of GNP archives*



2005

*Greg Pederson photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Blackfoot – Jackson Glacier

Glacier National Park, MT

1914



*E. C. Stebinger photo
courtesy of GNP
archives*

2001



*Blase Reardon photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Boulder Glacier

Glacier National Park, MT



1932

*T. J. Hileman photo
courtesy of GNP archives*



1988

*Jerry DeSanto photo
K. Ross Toole Archives
Mansfield Library, UM*



USGS Repeat Photography Project
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Boulder Glacier

Glacier National Park, MT



1932

*T. J. Hileman photo
courtesy of GNP archives*



2005

*Greg Pederson photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Boulder Glacier

Glacier National Park, MT



circa **1910**

*Morton Elrod photo
courtesy of GNP archives*



2007

*Fagre / Pederson photo
USGS*



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Chaney Glacier

Glacier National Park, MT



1911

*M.R. Campbell photo
USGS Photographic Library*



2005

*Blase Reardon photo
USGS*



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Chaney Glacier

Glacier National Park, MT



1911

M.R. Campbell photo
USGS Photographic Library



2005

Blase Reardon photo
USGS



USGS Repeat Photography Project
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Grant Glacier

Glacier National Park, MT



1902

*Morton Elrod photo
courtesy of GNP Archives*



1998

*Karen Holzer photo
USGS*



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Grinnell Glacier

Glacier National Park, MT



1900

*F. E. Matthes photo
courtesy of GNP Archives*



2008

Lisa McKeon photo, USGS

In 1900 Grinnell Glacier's mass filled the cirque basin. This early photo shows the glacier's height along the headwall and how it was once joined the upper ice portion, now called The Salamander.



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Grinnell Glacier

Glacier National Park, MT



1910

*Fred Kiser photo
courtesy of GNP Archives*



2008

Lisa McKeon photo, USGS



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1911

*Stanton photo
courtesy of GNP Archives*



2008

Lisa McKeon photo, USGS

Nearly a century after Stanton's photograph was taken, Grinnell Glacier has receded into its cirque basin and is no longer visible from the trail above Grinnell Lake.



USGS Repeat Photography Project
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Grinnell Glacier

Glacier National Park, MT



1887

Lieutenant Beacon
courtesy of GNP Archives



2008

Lisa McKeon photo, USGS

Among the earliest photos of Grinnell Glacier, this 1887 image shows the immense extent and depth of the glacier at the turn of the 20th century. The glacier has responded to temperature and precipitation in the past 100 years, resulting in its obvious reduction in size.



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Grinnell Glacier

Glacier National Park, MT



circa 1920

*T. J. Hileman photo
courtesy of GNP Archives*



2008

Lisa McKeon photo, USGS

In addition to the change in the size of Grinnell Glacier, there is obvious change in the foreground streamside vegetation between these two images.



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Grinnell Glacier

Glacier National Park, MT



1914

*Marble photo
courtesy GNP Archives*



1938

*T. J. Hileman photo
courtesy GNP Archives*



2008

*Lisa McKeon photo
USGS*

Grinnell Glacier from the shore of Lake Josephine



USGS Repeat Photography Project
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Grinnell Glacier

Glacier National Park, MT



1938

T. J. Hileman photo
Courtesy of GNP Archives



1981

Carl Key photo
USGS



1998

D. Fagre photo
USGS



2006

Karen Holzer photo
USGS

Oblique view of Grinnell Glacier taken from the summit of Mount Gould, Glacier National Park. The relative sensitivity of glaciers to climate change is illustrated by the dramatic recession of Grinnell Glacier while surrounding vegetation patterns remain stable.



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Grinnell Glacier

Glacier National Park, MT



circa **1940**

*Unknown photographer
Courtesy of GNP Archives*



2006

*Karen Holzer photo
USGS*

Grinnell Glacier taken from the Grinnell Glacier Overlook off the Highline Trail, Glacier National Park. The view of Grinnell Glacier taken circa 1940 shows the early formation of Upper Grinnell Lake, a proglacial lake visible at the terminus of the glacier. The 2006 photo shows a dramatic increase in the size of the lake as a result of melting ice.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1920

*Unknown photographer
Courtesy of NPS Historic
Photograph Collection
Harpers Ferry Center*



2008

*Chris Miller photo
USGS*

The 1920 photo shows National Park Service Director, Steven Mather, on Piatt Path near present day Grinnell Glacier Overlook. Darren Pfeifle strikes a similar pose in the 2008 repeat photograph.

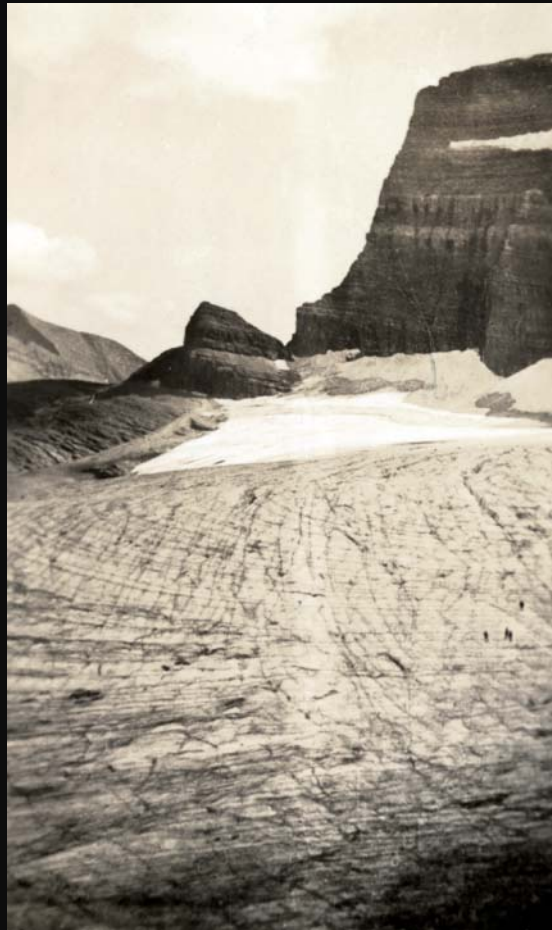


USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1922

*Morton Elrod photo
K. Ross Toole Archives
Mansfield Library, UM*



2008

*Lisa McKeon photo
USGS*

View from north moraine of Grinnell Glacier



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1924

*Morton Elrod photo
K. Ross Toole Archives
Mansfield Library, UM*



2008

*Lisa McKeon photo
USGS*

North moraine of Grinnell Glacier

In 1924 the glacier's ice margin was still in proximity to it's lateral moraine



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1926

*Morton Elrod photo
K. Ross Toole Archives
Mansfield Library, UM*



2008

*Lisa McKeon photo
USGS*

This large boulder was used by Morton Elrod and other scientists as a baseline to measure the retreat of Grinnell Glacier's terminus. It is now referred to as "Elrod's Rock," and the glacier's terminus is no longer visible from this point.

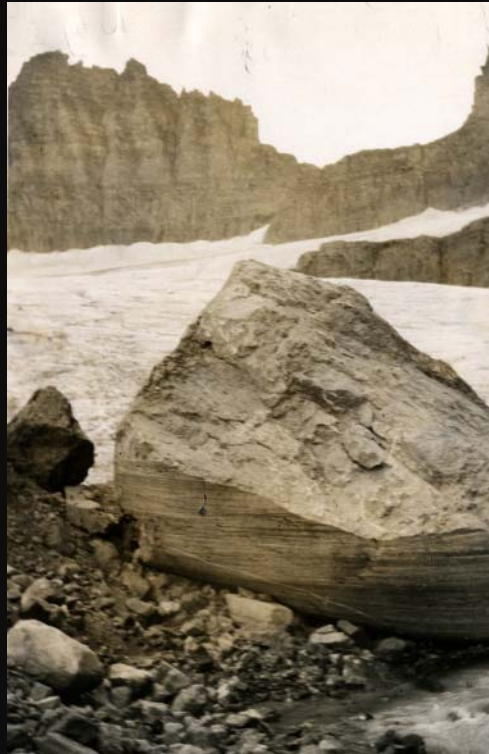


USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1924

Morton Elrod photo
K. Ross Toole Archives
Mansfield Library, UM



2008

Lisa McKeon photo
USGS

This large boulder was used by Morton Elrod and other scientists as a baseline to measure the retreat of Grinnell Glacier's terminus. It is now referred to as "Elrod's Rock," and the glacier's terminus is no longer visible from this point.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Grinnell Glacier

Glacier National Park, MT



1920

*W. C. Alden photo
USGS Photographic Library*



2008

Chris Miller photo, USGS

This pair of photographs from Grinnell Glacier's southeast edge shows the dramatic change in the glacier's volume and area. Note the glacier's depth along the headwall and its extent at the terminal moraine in the historic photograph.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Piegan Glacier

Glacier National Park, MT



circa **1930**

*George Ruhle photo
courtesy of GNP Archives*



1998

*Lisa McKeon photo
USGS*

Piegan Glacier appears visibly unchanged in this pair, but the meadow in foreground has undergone significant vegetation change.

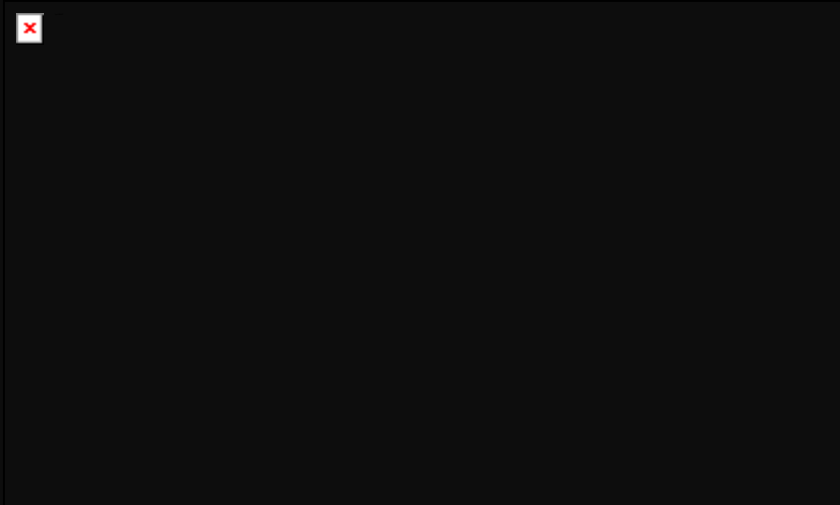


USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Piegan Glacier

Glacier National Park, MT



1938

*T. J. Hileman photo
courtesy of GNP Archives*



1998

*Lisa McKeon photo
USGS*

View from Mount Siyeh

Piegan Glacier is one of the few glaciers in Glacier National Park that has not significantly changed since photographed in the 1930s.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Sexton Glacier

Glacier National Park, MT



1901

*Matthes photo
courtesy of GNP Archives*



1998

*Lisa McKeon photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Shepard Glacier

Glacier National Park, MT



1913

*W. C. Alden photo
USGS Photographic Library*



2005

*Blaise Reardon photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Sperry Glacier

Glacier National Park, MT



1913 *W. C. Alden photo, courtesy GNP Archives*



2008 *Lisa McKeon photo, USGS*

In 1913, Sperry Glacier's mass spanned across the entire basin and the glacier's terminus was recorded at over 150 ft. tall. Contemporary images show how the glacier has receded and separated into fragments.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Sperry Glacier

Glacier National Park, MT



circa **1930**

*Morton Elrod photo
K. Ross Toole Archives
Mansfield Library, UM*



2008

Lisa McKeon photo, USGS

Repeating Elrod's photograph from the same photo point was impossible since he shot from the elevated perspective of the glacier's surface. The terminus of the glacier has retreated beyond the field of view, but these images give a sense of the glacier's extent and mass early in the 20th century.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Sperry Glacier

Glacier National Park, MT



1907

Morton Elrod photo
courtesy of GNP Archives



2001

Lisa McKeon photo
USGS

*The northwest portion of Sperry Glacier once spanned
Comeau Pass to the base of Edwards Mountain.*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Sperry Glacier – northeast view

Glacier National Park, MT



1913

*Alden photo, courtesy of GNP Archives
Aug. 13, 1913*



2007

*Lisa McKeon photo, USGS
Sept. 15, 2007*

This view of the northeast portion of Sperry Glacier shows evidence of the glacier's recession as well as the advancement of conifer species and other vegetation on the glacial moraines.



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Swiftcurrent Glacier

Glacier National Park, MT



circa **1900**

*Matthes photo
courtesy of GNP Archives*



1998

*Karen Holzer photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Swiftcurrent Glacier

Glacier National Park, MT



circa **1930**

*Unknown photographer
courtesy of GNP Archives*



2002

*Karen Holzer photo
USGS*

View from Swiftcurrent Lookout



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>



Thunderbird Glacier

Glacier National Park, MT



1907

*Morton Elrod photo
courtesy of GNP Archives*



2007

*Dan Fagre / Greg Pederson photo
USGS*



USGS Repeat Photography Project
<http://nrmsc.usgs.gov/repeatphoto/>

