

Comparison Pictures of Receding Glaciers



In the photo above, the west shoreline of Muir Inlet in Alaska's Glacier Bay National Park & Preserve is shown as it appeared in 1895. Notice the lack of vegetation on the slopes of the mountains, and the glacier that stands more than 300 feet high. See the glacier as it looked in 2005 on the next page. (USGS/Bruce Molnia)



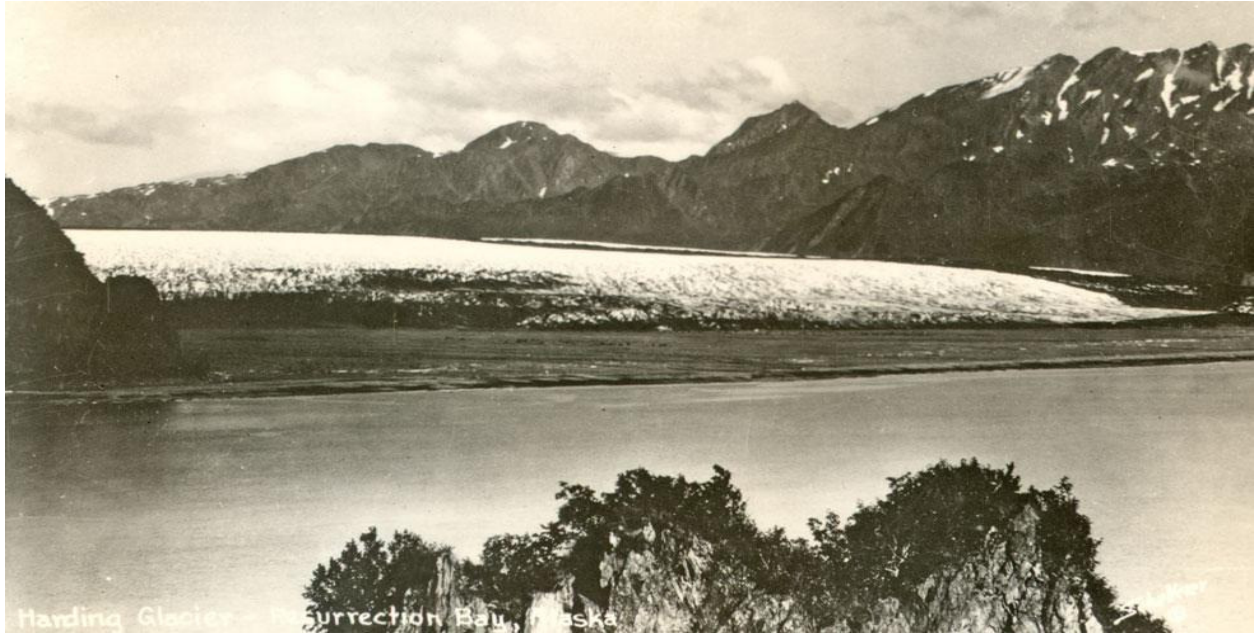
In the photo above, the west shoreline of Muir Inlet in Alaska's Glacier Bay National Park & Preserve is shown as it appeared in 2005. Over the century since the first photo was taken, Muir Glacier ceased to have a tidewater terminus. Note the lack of floating ice and the abundant vegetation on many slopes. (USGS/Bruce Molnia)



Taken on Wachusett Inlet in the Saint Elias Mountains of Alaska, this photo from September 1961 shows the lower reaches of Plateau Glacier, then a tidewater calving valley glacier with parts of its terminus being land based on either side of the fjord. Including submarine ice, the total ice thickness here is greater than 650 feet. (NPS/R.D. Karpilo)



The 2003 repeat photograph documents the dramatic changes that occurred over 42 years. Plateau Glacier retreated out of the field of view and has all but melted away, after leaving a small remnant, Plateau Remnant, on the flanks of the Bruce Hills. The tributary glacier that formerly supported the medial moraine has retreated nearly 2 miles. (NPS/R.D. Karpilo)



Both photos in this pair were taken from the same location on a ridge in Bulldog Cove, near Bear Glacier Point, Kenai Mountains, Alaska, show the changes to Bear Glacier between the early 1920s and 2005. The older photograph is from a postcard labeled Harding Glaciers, Resurrection Bay, Alaska. (USGS/Bruce Molnia)



In the approximately 80 years between these photos, Bear Glacier's piedmont lobe has retreated completely out of the field of view. Large icebergs, floating in the ice-marginal lake that fills the basin formerly occupied by Bear Glacier's piedmont lobe, represent the only glacier ice that is visible. (USGS/Bruce Molnia)



A pair of photos taken from the same location on the west shoreline of Harris Bay in Alaska's Kenai Fjords National Park. The first is an undated winter to early summer view, probably from the mid-1920s to the 1940s. The rocky shoreline in the foreground is covered by numerous small icebergs calved by the retreating Northwestern Glacier. (USGS/Bruce Molnia)



The second photo dates from August 12, 2005. In the roughly 60 to 80 years between photos, Northwestern Glacier has retreated out of the field of view. In fact, the 2005 terminus is located more than 6 miles to the northwest. Ice-free Harris Bay makes up the foreground of the image. (USGS/Bruce Molnia)



Taken from a cobble beach on the west shoreline of Harris Bay in Alaska's Kenai Fjords National Park, this 1909 photo shows the retreating terminus of the Northwestern Glacier, which then stood just over 160 feet high. No vegetation is visible in the photograph. (USGS/U.S. Grant)



By August 2004, the Northwestern Glacier has retreated out of the field of view. In fact, the 2004 terminus is located more than 6 miles to the northwest. Ice-free Harris Bay makes up the foreground of the image. (USGS/Bruce Molnia)



When photographed here sometime between the 1920s and the 1940s, Pedersen Glacier was calving icebergs into the lake from a seracs-capped terminus that ranged from about 66 to 131 feet high. No vegetation is visible. (Kenai Fjords National Park)



The second photo dates was taken Aug. 10, 2005. Since the first photo, most of the lake has filled with sediment and now supports grasses, shrubs and aquatic plants. The glacier's terminus has retreated by more than a mile and no icebergs are visible. Isolated patches of snow are present at a few higher elevation locations. (USGS/Bruce Molnia)



The first photo was taken by U.S. Grant from the west shoreline of Aialik Bay on July 23, 1909, a view of the then-retreating northern part of the Pedersen Glacier terminus. The water in the foreground is part of an ice-marginal lake/lagoon located next to Aialik Bay. (USGS/U.S. Grant)



In the 94 years between the photos, most of the lake/lagoon has filled with sediment and now supports several varieties of grasses, shrubs, and aquatic plants. Only a few small icebergs are visible. Note that vegetation has developed on nearly every exposed land surface. (USGS/Bruce Molnia)



This 1899 photo shows the approximately 197-ft.-high tidewater terminus of the then-retreating Reid Glacier in Glacier Bay National Park. The hillside in the foreground is covered by a few inches of snow. No trees are present on the hillside or on any other surface in the field of view. (USGS/G.K. Gilbert)



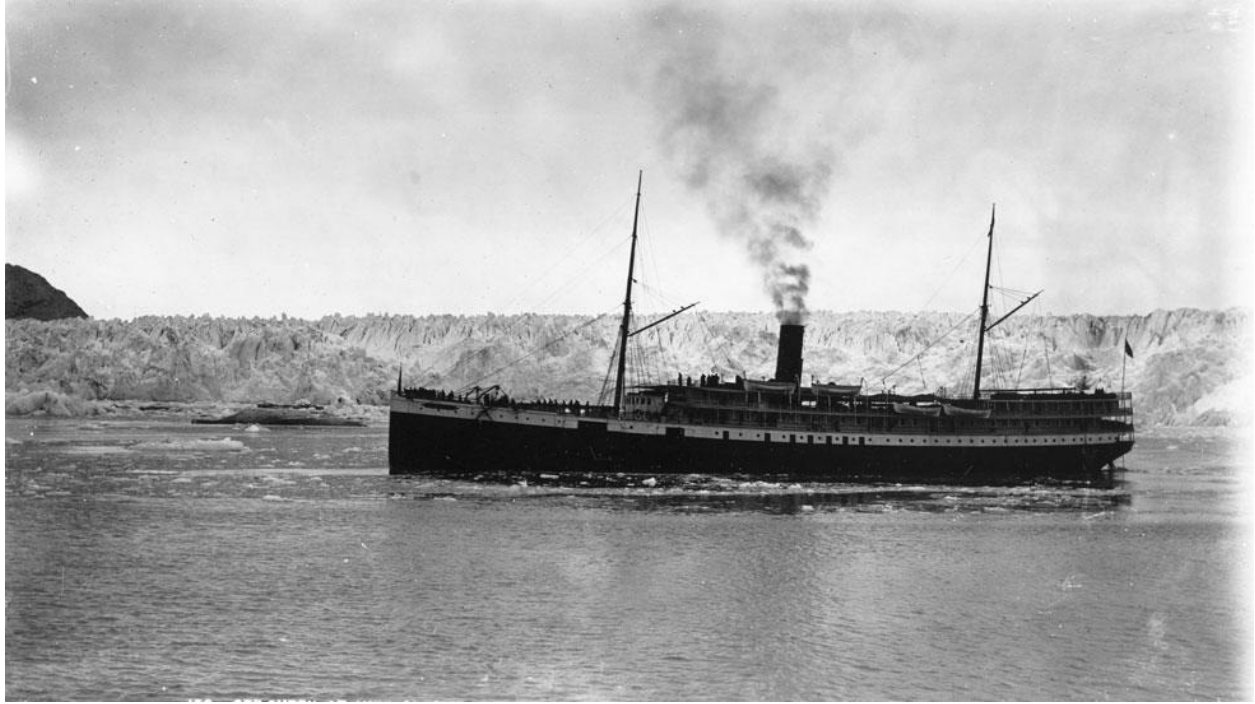
In the 104 years between photographs, Reid Glacier has retreated nearly 2 miles. The hillside in the foreground is covered with dense vegetation, including both conifers and deciduous trees. Vegetation covers much of the lower slopes on the opposite side of the inlet. (USGS/Bruce Molnia)



The first photo was taken in 1890, in Muir Inlet in Alaska's Glacier Bay National Park and Preserve.
(USGS/Bruce Molnia)



The second photo was taken in 2005, in Muir Inlet in Alaska's Glacier Bay National Park and Preserve.
(USGS/Bruce Molnia)



The first photo was taken in 1896, in Muir Inlet in Alaska's Glacier Bay National Park and Preserve.
(USGS/Bruce Molnia)



The second photo was taken in 2005, in Muir Inlet in Alaska's Glacier Bay National Park and Preserve.
(USGS/Bruce Molnia)



The first photo, taken in June 1937, shows the tidewater terminus of the Yale Glacier in Prince William Sound, Alaska. Except for the moraine-covered ice on both margins of the glacier, snow still covers most of the lower reaches of the glacier. (USGS/Bruce Molnia)



During the 69 years between photos, Yale Glacier has retreated by nearly 4 miles, with most of the retreat occurring after 1957. The width of the tidewater part of the terminus of the glacier is much less than half of what it was in 1937. The glacier also has thinned substantially, in places by more than 800 feet. (USGS/Bruce Molnia).



A photographer and several tourists explore the icebergs in Muir Inlet sometime in the 1880s or 1890s, while in the background the glacier rises more than 300 feet above the water. Numerous icebergs, some more than 6 1/2 feet in diameter, are grounded on the tidal flat. (USGS/G.D. Hazard)



By the time this 2005 photo was taken, Muir Glacier had retreated more than 30 miles and is completely out of the field of view. The beach in the foreground is covered by a cobble and pebble lag deposit, which was winnowed from sediment deposited by Muir Glacier and by melting grounded icebergs. (USGS/Bruce Molnia)



The 1941 photo shows the lower reaches of Muir Glacier, then a large, tidewater calving valley glacier and its tributary Riggs Glacier. Back then, Muir and Riggs Glaciers filled what is now Muir Inlet. Note the absence of any identifiable vegetation and the numerous bare bedrock faces present on both sides of the glacier.

(NSIDC/W.O. Field)



This Aug. 31, 2004, photo shows dramatic changes since the first photo was taken more than 60 years earlier. Muir Glacier has retreated out of the field of view and is now located more than 4 miles to the northwest. Note the dense vegetation that has developed on the till cover of White Thunder Ridge. (USGS/Bruce Molnia)



This photo, taken in August 1906 by Charles Will Wright, shows the calving terminus of Carroll Glacier sitting at the head of Queen Inlet in Glacier Bay National Park and Preserve. No vegetation is visible. (USGS/Charles Will Wright)



The second photo, taken in June 2004, shows that the terminus of Carroll Glacier has changed to a stagnant, debris-covered glacier that has significantly thinned and retreated from its 1906 position. The head of Queen Inlet has been filled by sediment, which reaches over 400 feet in places. (USGS/Bruce Molnia)



This 1976 photo shows the calving terminus of Muir Glacier extending the width of the fjord in upper Muir Inlet, in Glacier Bay National Park. Aside from algae growing on a lighter colored dike, there is no vegetation visible in the photo. (USGS/Bruce Molnia)



The 2003 photo above documents the disappearance of Muir Glacier from the field of view. The two small cirque glaciers at the upper left have probably not been connected to Muir Glacier, which has retreated more than 6 miles to the north. Note that vegetation is beginning to develop. (USGS/Bruce Molnia)



The photo above, taken in July 1909, shows a scene about 5 miles north of the mouth of the McCarty Fjord in Alaska's Kenai Fjords National Park. The east side of the terminus of the then-retreating McCarty Glacier is shown, and little, if any, vegetation is present on the upper slopes. (USGS/U.S. Grant)



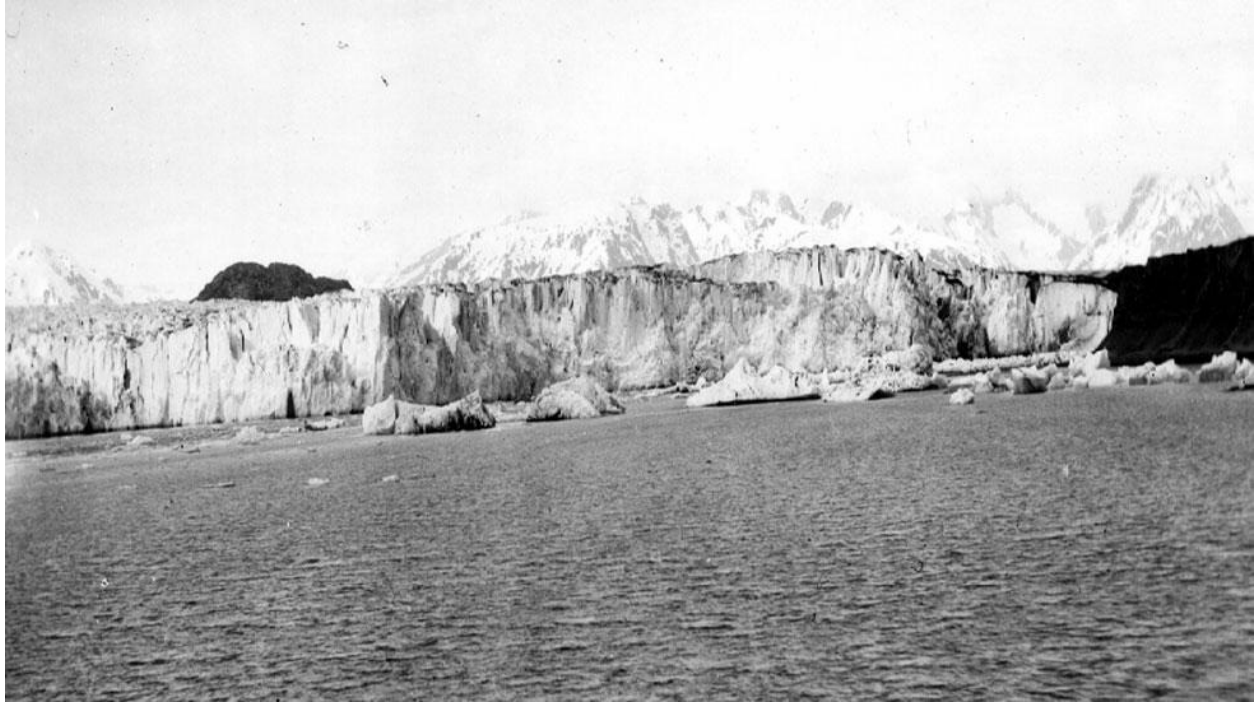
The second photo, taken in August 2004, shows part of McCarty Glacier now retreated more than 9 miles up the bay. Dense, diverse vegetation, featuring alder, willow, and spruce, has become established on the hill slopes and back beach areas. (USGS/Bruce Molnia)



Another early photo of the McCarty Glacier, taken on July 31, 1909. (USGS/U.S. Grant)



Nearly a century later, the same McCarty Glacier, photographed on August 10, 2004. (USGS/Bruce Molnia)



Taken from the shoreline near Muir Point in Alaska's Glacier Bay National Park and Preserve, Alaska, this 1899 photo by Grove Karl Gilbert shows the calving terminus of Muir Glacier near its confluence with Adams Glacier. No vegetation is visible. (USGS/G.K. Gilbert)



The 2003 photo documents the disappearance of Muir and Adams Glaciers from the field of view. Muir Glacier has retreated more than 25 miles to the north. Note the extensive vegetation that has developed. (USGS/Bruce Molnia)



Taken on Nuka Passage in Kenai Fjords National Park, this 1909 photo shows the retreating northern part of the terminus of Yalik Glacier. When photographed, Yalik Glacier had a gently sloping terminus with little elevation at its margin. (USGS/D.F. Higgins)



The second photo, taken in August 2004, shows a Yalik Glacier that has thinned by more than 320 feet and retreated by nearly a mile. It is now fronted by an ice-marginal lake. The shoreline south of the glacier supports several varieties of grasses, shrubs, and trees. (USGS/Bruce Molnia)



This June 1919 photo was taken near a retreating valley glacier along the East Fork of the Teklanika River in Alaska's Denali National Park. Small tundra plants are the only identifiable vegetation. (USGS/Stephen Capps)



This August 2004 photograph documents the continued thinning and retreat of East Fork Teklanika Glacier, which retreats at an average rate of about 13 feet per year. (National Park Service/Ron Karpilo)



Taken along the west shoreline of Harris Bay in Kenai Fjords National Park, this winter-to-early-spring view probably dates from the mid-1920s to the 1940s. The shallow water next to the shoreline is covered by sea ice, which contains a number of pieces of brash ice. (Kenai Fjords National Park)



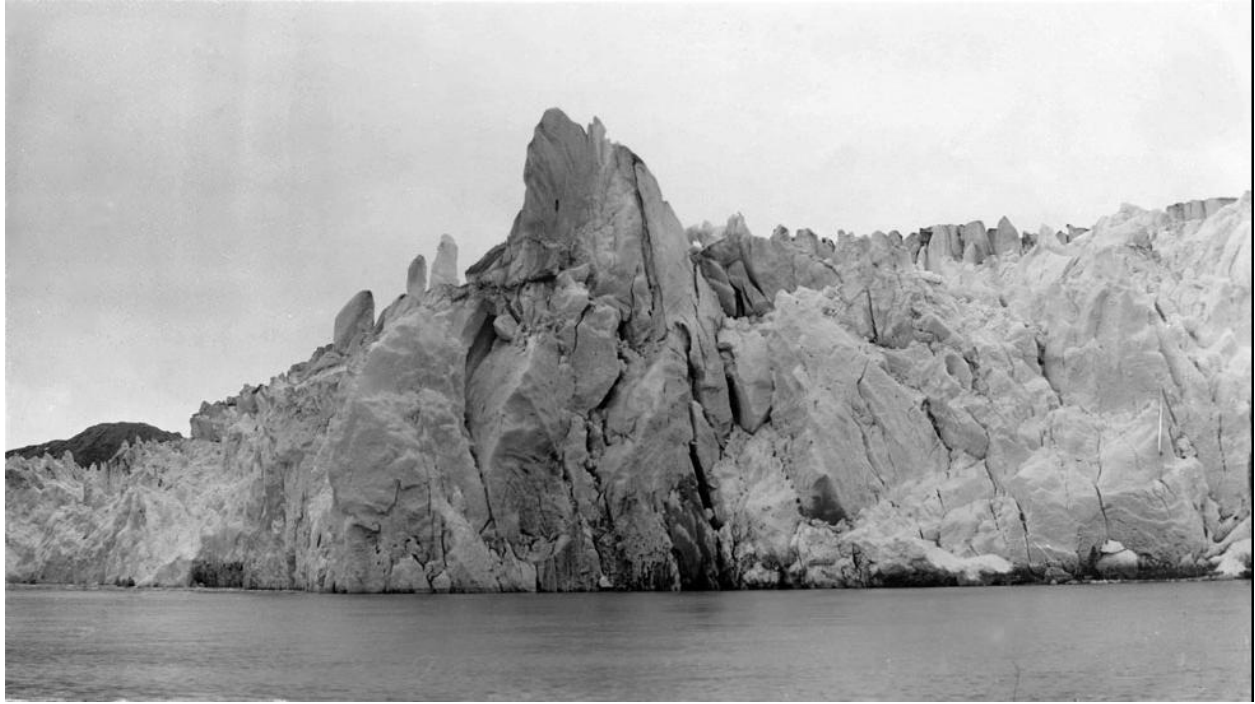
The second photo was taken in August 2005, and shows the Northwestern Glacier has retreated out of the field of view. Sedimentation and uplift have expanded the shore area and produced a marshy wetland covered by a diverse array of vegetation. (USGS/Bruce Molnia)



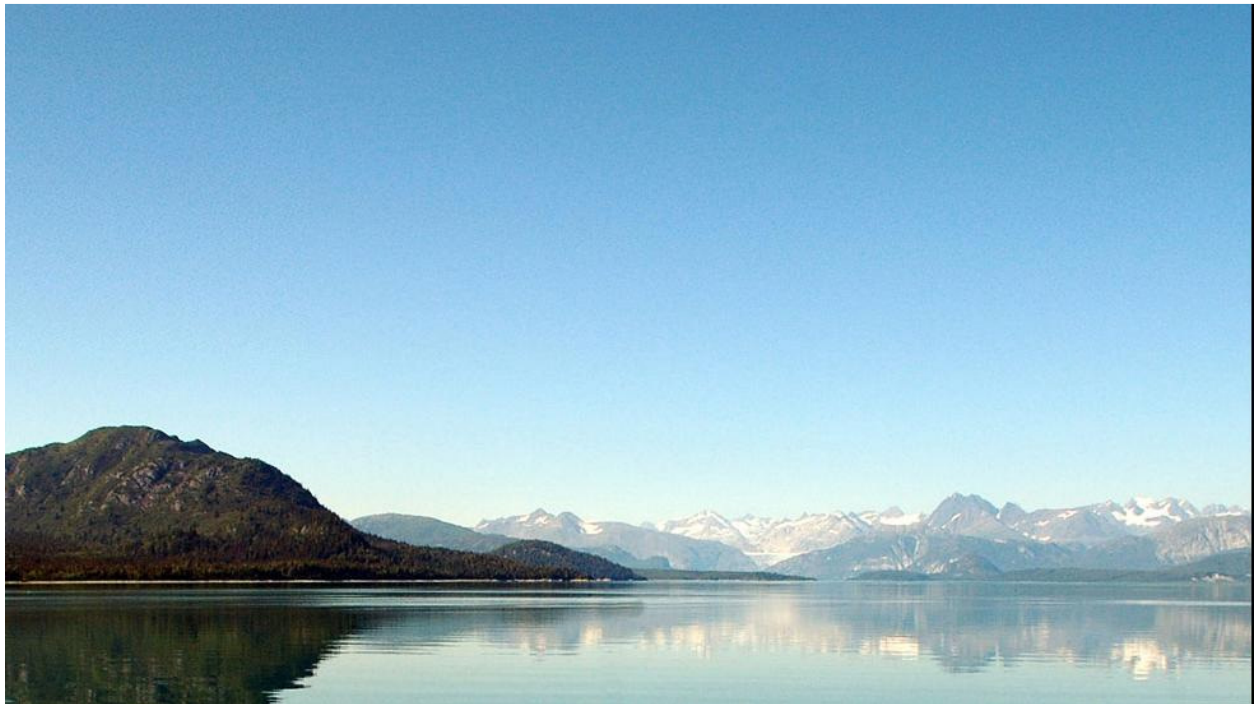
Taken near the Tobaggan Glacier in Alaska's Chugach National Forest, this August 1905 photo shows the glacier thinning and retreating, surrounded by a large bedrock barren zone. Minimal vegetation existed on the fjord-facing hill slopes. (USGS/Sidney Paige)



By the time this photo was taken in August 2008, the thin tongue of ice that was visible on the glacier's terminus years earlier is gone. Both hanging glacier tributaries continue to retreat. (USGS/Bruce Molnia)



This photo, taken in the winter of 1895, shows a massive glacier on Muir Inlet. (USGS)



A hundred and ten years later, Bruce Molnia photographed the same location on Muir Inlet, showing the glacier retreated completely from view. (USGS/Bruce Molnia)