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Area of the Named Glaciers of Glacier National Park (GNP) and Flathead National Forest (FNF) at Little Ice Age maximum extent, 1966, 1998, 2005 and 2015

These data represent a time series of the 37 named glaciers of Glacier National Park, MT, USA and two named glaciers in the Flathead National Forest. Glaciers on this landscape have ecological value as a source of cold meltwater in the otherwise dry late summer months, and aesthetic value as the park's namesake features. Establishing rates of glacier retreat using the decreasing area of glacier ice is key to understanding the Glacier National Park ecosystem and future state of resources.

Area of Named Glaciers in GNP and FNF from Status of Glaciers in GNP

Glacier Name	Glacier Location	Area LIA (km^2)	Area 1966 (km^2)	Area 1998 (km^2)	Area 2005 (km^2)	Area 2015 (km^2)	% Decrease LIA to 2015
Agassiz	GNP	4.2470	1.6006	1.1745	1.0396	0.7367	83
Ahern	GNP	0.7651	0.5892	0.5167	0.5119	0.5116	33
Baby	GNP	0.1361	0.1172	0.0809	0.0760	0.0756	44
Blackfoot	GNP	4.9701	1.8325	1.6251	1.6302	1.4985	70
Boulder	GNP	0.8296	0.2310	0.0488	0.0458	0.0353	96
Carter	GNP	0.7081	0.3557	0.2690	0.2344	0.2248	68
Chaney	GNP	1.0789	0.5638	0.4304	0.3597	0.3345	69
Dixon	GNP	0.6710	0.2911	0.1670	0.1627	0.1258	81
Gem	GNP	0.0244	0.0291	0.0238	0.0235	0.0222	9
Grinnell	GNP	1.9765	1.0202	0.7159	0.6156	0.5637	71
Harris	GNP	0.0793	0.1485	0.0403	0.0390	0.0343	57
Harrison	GNP	3.4705	2.0594	1.8462	1.6977	1.6615	52
Herbst	GNP	0.3432	0.1702	0.0508	0.0409	0.0319	91
Hudson	GNP	0.1322	0.0902	0.0558	0.0523	0.0522	61
Ipasha	GNP	0.5941	0.3286	0.2283	0.1958	0.1947	67
Jackson	GNP	3.0943	1.2805	0.8119	0.8033	0.7569	76
Kintla	GNP	2.7803	1.3090	0.9729	0.9312	0.8777	68
Logan	GNP	0.6943	0.5034	0.3875	0.3679	0.2190	68
Lupfer	GNP	0.1712	0.1264	0.0667	0.0638	0.0733	57
Miche Wabun	GNP	0.2633	0.2045	0.1111	0.1075	0.1036	61
N Swiftcurrent	GNP	0.2273	0.1167	0.0845	0.0902	0.0863	62
Old Sun	GNP	0.4997	0.4213	0.3491	0.3468	0.3411	32
Piegan	GNP	0.3112	0.2802	0.2651	0.2508	0.2443	21
Pumpelly	GNP	1.9790	1.0065	0.9106	0.9088	0.9028	54
Rainbow	GNP	1.9104	1.4304	1.1208	1.0900	1.0534	45
Red Eagle	GNP	0.4771	0.1347	0.0779	0.0779	0.0637	87
Salamander	GNP	0.2501	0.2290	0.1817	0.1736	0.1761	30
Sexton	GNP	0.5282	0.4005	0.3240	0.3128	0.2987	43
Shepard	GNP	0.4972	0.2507	0.0916	0.0752	0.0707	86
Siyeh	GNP	0.3780	0.3063	0.2146	0.2147	0.2054	46
Sperry	GNP	3.7933	1.3395	0.9531	0.8881	0.8017	79
Swiftcurrent	GNP	0.5942	0.2218	0.1887	0.1762	0.1703	71
Thunderbird	GNP	1.0751	0.1351	0.1219	0.1160	0.1070	90
Two Ocean	GNP	1.0769	0.4290	0.1937	0.1892	0.0752	93
Vulture	GNP	0.8115	0.4080	0.3369	0.3292	0.2968	63
Weasel Collar	GNP	0.8098	0.5581	0.5074	0.5066	0.4997	38
Whitecrow	GNP	0.7415	0.2425	0.1248	0.1128	0.1038	86
GNP Total	**GNP**	**42.9900**	**20.7614**	**15.6698**	**14.8576**	**13.6306**	**68**
Grant	FNF	0.8429	0.3478	0.2882	0.2858	0.2792	67
Stanton	FNF	0.9502	0.5324	0.3152	0.3016	0.2690	72
FNF Total	**FNF**	**1.7931**	**0.8801**	**0.6034**	**0.5874**	**0.5481**	**69**

For more information: https://www.usgs.gov/centers/norock/science/retreat-glaciers-glacier-national-park?qt-science_center_objects=1#qt-science_center_objects

Salamander and Jackson glaciers were not initially named as separate glaciers until retreat fragmented these glaciers from Grinnell and Blackfoot glacier respectively. Topographic ledges were used to distinguish these as separate features, for the purposes of intercomparison and consistency with previously published named glacier data. Subsequent time stamps in the time series show clear and distinct glacier fragmentation.

Italicized glacier names identify glaciers that are no longer >0.1 km2 by 2015.

Glacier margins were digitized from late-summer aerial and satellite imagery to capture glacier margins when seasonal snow was least present on the glacier surface. The glacier's maximum extent during the peak of the Little Ice Age (LIA, mid-nineteenth century) was determined from moraines visible in satellite imagery. Specific image sources are available in the cited data releases. Completion of this named glacier time series revealed that in some cases the 1966 data extend beyond LIA data. This prompted reanalysis of the original 1966 aerial imagery against modern high-resolution imagery and geologic evidence. Any necessary corrections of the 1966 glacier maps are ongoing and will be available in a forthcoming data publication.

Data Summary:

· Comparison between years shows every named glacier reduced in area from LIA extent to 2015/6, although rates of loss are variable
· Moraines indicate that 82 glaciers >0.1 km2 existed in and near GNP during the LIA
· The 2015 data reveal that 26 named glaciers remain >0.1 km2 (25 acres)
· The mean reduction in named glacier area between 1966 and 2015 was 40%
· The mean reduction in named glacier area between LIA and 2015 was 68%

Data Sources:

Fagre, D.B., McKeon, L.A., Dick, K.A., and Fountain, A.G., 2017, Glacier margin time series (1966, 1998, 2005, 2015) of the named glaciers of Glacier National Park, MT, USA: U.S. Geological Survey data release, https://dx.doi.org/10.5066/F7P26WB1.

Fagre, D.B., and Martin-Mikle, C.J., 2018, Maximum glacial extent of the named glaciers in Glacier National Park during the peak of the Little Ice Age: U.S. Geological Survey data release, https://www.sciencebase.gov/catalog/item/5b194f1ce4b092d965237f5f.