



Size of Wilderness Areas

Wilderness areas are defined to be areas that are left to develop with no or without hardly any human interference. In Switzerland, this applies to just under one fifth of the country's expanse. Consisting mostly of rock and scree, wilderness areas are primarily to be found at high altitudes, both within and outside of nature reserves. Some of these areas are located in very rough terrain. As the biological quality of wilderness areas varies, so does their significance for nature.

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Contents

Development in Switzerland.....	2
Development in the regions.....	3
Significance for biodiversity.....	4
Definition.....	5
Surveying methods.....	5
Further information.....	6

Development in Switzerland

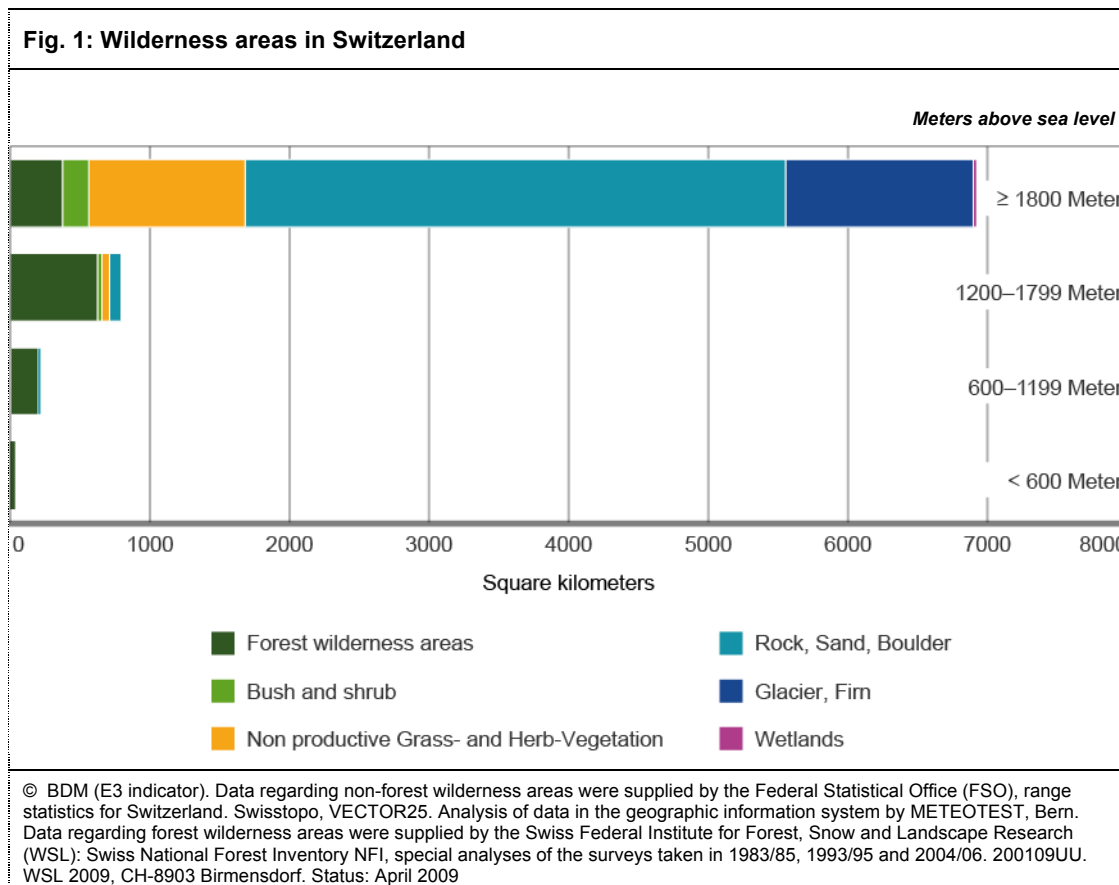
In the 1990s, wilderness areas in Switzerland covered just under 8,000 square kilometers (3,089 sq mi), which corresponds to roughly 19% of the country's expanse.

The table below lists wilderness areas in Switzerland in the 1990s (1992 to 1997), categorized by altitude and ground cover and indicated in square kilometers (km²) and percent (%) of the area at that particular altitude. Moreover, forest wilderness areas are listed with a 95% confidence interval.

Tab. 1: Wilderness areas in Switzerland

Meters above sea level	Expanse km ²	Forest wilderness areas		Glaciers		Other wilderness areas		Total	
		km ²	%	km ²	%	km ²	km ²	%	
< 600	10'737	30 ± 14	<1	0	0	< 600	10'737	30 ± 14	<1
600–1'199	11'542	203 ± 36	2	0	0	600–1'199	11'542	203 ± 36	2
1'200–1'799	6'996	623 ± 61	9	2	<1	1'200–1'799	6'996	623 ± 61	9
≥ 1'800	12'010	373 ± 46	3	1'297	11	≥ 1'800	12'010	373 ± 46	3
Total	41'285	1'228 ± 81	3	1'298	3	Total	41'285	1'228 ± 81	3

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Comments

- In the 1990s, 6'902 square kilometers (2'665 sq mi) or 57% of the expanse located above 1'800 meters above sea level were left to nature. Of these wilderness areas, 1'297 square kilometers (500 sq mi) were covered by glaciers.
- Wilderness areas are predominantly located above 1'800 meters above sea level.
- There are hardly any lowland wilderness areas left outside forests, except for a few isolated small-range wild wetlands.
- "Other wilderness areas" encompass rock, sand and scree as well as unproductive shrub, grass and forb vegetation.
- Glaciers and firm cover 3% of Switzerland's expanse.
- Forest wilderness areas are recorded using sampling surveys by the Swiss National Forest Inventory (NFI). They have a 95% likelihood of covering between 1'148 and 1'309 square kilometers (443 and 505 sq mi), which corresponds to 2.8% and 3.2% respectively of the country's expanse.
- Some of Switzerland's forest wilderness areas are "nature forest reserves" which are not harvested by forestry. With their habitat deliberately left to follow natural life cycles, many trees are once again able to reach their full biological age. Between 2001 and 2007, the area of nature forest reserves has doubled to just over 150 square kilometers (58 sq mi).

Development in the regions

Among Switzerland's regions, most wilderness areas are to be found in the Central Alps. In the Jura and on the Central Plateau, however, wilderness is a rare commodity.

The table below lists wilderness areas in Switzerland's biogeographical regions in the 1990s (1992 to 1997), categorized by ground cover and indicated in square kilometers (km²) and percent (%) of the expanse of that particular region. Moreover, forest wilderness areas are listed with a 95% confidence interval.

Meters above sea level	Expanse	Forest wilderness areas		Glaciers		Other wilderness areas		Total	
	km ²	km ²	%	km ²	%	km ²	km ²	%	
Jura	4'307	2 ± 4	<1	0	0	0	0	2 ± 4	<1
Central Plateau	11'161	4 ± 5	<1	0	0	1	<1	4 ± 5	<1
Northern Alps	11'485	285 ± 33	2	346	3	1,380	12	2'012 ± 33	18
Western Central Alps	4'837	129 ± 22	3	727	15	1,377	28	2'232 ± 22	46
Eastern Central Alps	5'828	208 ± 28	4	182	3	1,882	32	2'271 ± 28	39
Southern Alps	3'667	601 ± 44	16	43	1	722	20	1'367 ± 44	37

© BDM (E3 indicator). Data regarding non-forest wilderness areas were supplied by the Federal Statistical Office (FSO), range statistics for Switzerland. Swisstopo, VECTOR25. Analysis of data in the geographic information system by METEOTEST, Bern. Data regarding forest wilderness areas were supplied by the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL): Swiss National Forest Inventory NFI, special analyses of the surveys taken in 1983/85, 1993/95 and 2004/06. 200109UU. WSL 2009, CH-8903 Birmensdorf. Status: April 2009

Comments

- In the 1990s, 2'012 square kilometers (777 sq mi) of the Northern Alps were left to nature. This corresponds to 18% of the region's expanse.
- "Other wilderness areas" encompass rock, sand and scree as well as unproductive shrub, grass and forb vegetation.
- Wilderness areas are almost exclusively located in the Alps. Their share in the expanse of the Jura and the Central Plateau is insignificant.
- 46% of the Western Central Alps' expanse is left to nature. Almost half of these wilderness areas, however, are rock, sand and scree.
- Forest wilderness areas were registered using sampling surveys by the Swiss National Forest Inventory (NFI). In the Eastern Central Alps, they have a 95% likelihood of covering between 180 and 236 square kilometers (69 and 91 sq mi), which corresponds to 3.1% and 4.1% respectively of the region's expanse. The table lists the rounded-up mean of 4%.
- At roughly 600 square kilometers (232 sq mi), the Southern Alps leave almost as much forest to nature as all other Swiss regions combined (627 square kilometers or 242 sq mi). This must partly be attributed to the lower density of their forestry road network (see also the E15 indicator "Landscape Fragmentation").

Significance for biodiversity

For the purpose of this indicator, "wilderness areas" are defined to be areas not subject to land use and located at a distance of at least 500 meters from settlements, roads (incl. forestry and alpine pasture roads) and other infrastructures. Below 1,800 meters above sea level, 95% of Switzerland's expanse are built up with or less than 500 meters away from infrastructures. Above 1,800 meters, that share still reaches 33%. All these areas are not considered to be "wilderness areas", since natural processes might be disturbed. Alpine huts and mountain forests are usually accessible by road, and forests are harvested or tended as avalanche protection forests.

Unlike what could be assumed, it is not harboring an above-average diversity of species that makes wilderness areas so valuable, but the undisturbed nature of processes taking place there. Scree and rock faces, for example, are very poor in species. But these areas develop abiding by their own laws, offering habitats to specialized species.

Such undisturbed development results in "natural" and sustainable conditions. For one thing, forest wilderness areas hold a larger number of massive trees than production forests, not to mention a larger share of old forest and deadwood. Many insects, fungi, lichen, and birds are wholly or partly dependent on such structures and low-disturbance forest areas. However, forest wilderness areas tend to be denser and, hence, darker than production forests, since only natural events such as mud flows, avalanches, storms, and old trees falling will create the open spaces pioneer communities need to establish themselves. Since many plant and animal species need light and warmth, they will not find suitable habitats in such forests. For this reason, an increase in forest wilderness may negatively affect biodiversity. The same effect will be caused by forest wilderness spreading out onto former dry grassland.

Still, an increase in forest wilderness areas would essentially be a good thing from a biodiversity point of view because it takes a mosaic of avalanche protection and production forests in different shapes and forms, forests subject to specialized uses, and indeed forest wilderness areas to maintain the complete range of forest types and biological forest functions in Switzerland.

It is safe to assume that the current climate change will affect the composition of high-altitude wilderness areas, with rocks and moraines exposed by melting glaciers, and the tree line shifted upwards. Since the snow line is ascending as well, infrastructures for winter tourism at higher altitudes are likely to be extended. If this happens, the area left to nature will continue to dwindle.

Definition

Changes in the sum of wilderness areas in Switzerland and its biogeographical regions.

Wilderness areas are defined to be areas that, according to FSO range statistics, are not subject to any kind of land use and located at a certain distance—usually 500 meters—from disruptive infrastructures. Disruptive infrastructures are defined to be settlements, roads, train tracks, ski lifts and the like. This definition applies to wilderness areas outside of forests.

Wilderness areas also include forest areas that have either not been harvested for at least 50 years or that are located in brushwood or inaccessible forests. Furthermore, these forest areas must be at least 500 meters away from the closest forestry road and not subject to grazing in order to qualify as wilderness areas.

Waterbodies are not covered by this definition. For the time being, suitable basic data to monitor water wilderness areas are lacking.

Surveying methods

Information on wilderness areas (excluding forests) is based on sampling surveys taken for FSO range statistics by the Federal Statistical Office and on the swisstopo digital landscape model of Switzerland. FSO range statistics identify areas that are not subject to land use, i.e. “brush and shrub vegetation”, “glaciers, firn”, “wet locations”, “unproductive grass and forb vegetation”, and “rock, sand, scree”.

Information on infrastructures is provided by the digital landscape model of Switzerland (VECTOR25). For this purpose, infrastructures are categorized by range of impact. In order to qualify as wilderness, an area must be located at least 500 meters away from infrastructures with long-range impact, or at least 25 meters away from infrastructures with short-range impact. Infrastructures with long-range impact include settlements, roads (down to a width of 3 meters), train tracks, as well as stations at the bottom and top of ski lifts, cableways and the like. Infrastructures with short-range impact include cabins and isolated inns, antennas, monuments and the like, material cableways, and power lines.

The distance between FSO range statistics sampling points and the closest infrastructure is calculated using the NEAR method in the geographic information system (GIS; ArcInfo or ArcGIS 9.2[®] workstations). Areas not subject to land use and infrastructure impact are classified as wilderness areas.

Information on forest wilderness areas is based on sampling surveys of the Swiss National Forest Inventory (NFI) in the 1993/95 surveying period (NFI2); calculations were made using data representative of the situation found then. The NFI sampling network consists of 23,223 grid points on Swiss soil. For the present analysis, variables were identified on squares of 50 by 50 meters. Data collection on survey areas commenced using aerial photographs, followed by additional data being gathered in the field.

Representatives of the Swiss National Forest Inventory subsequently computed means and standard errors regarding Switzerland overall and its six biogeographical regions. Standard errors were later converted into 95% confidence intervals by the BDM Coordination Office using a binominal distribution model.

Further information

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Additional sources of information

> www.bfs.admin.ch/bfs/portal/de/index/themen/02/03.html (Federal Statistical Office, range statistics; not available in English)

> <http://www.swisstopo.admin.ch/internet/swisstopo/en/home/products/landscape/vector25.html> (comprehensive information on VECTOR25, the digital landscape model of Switzerland)

> www.lfi.ch (comprehensive information on the Swiss National Forest Inventory)

This information is based on the German document 800_E3_Basisdaten_2009_V1_dt dated May 7th, 2009.