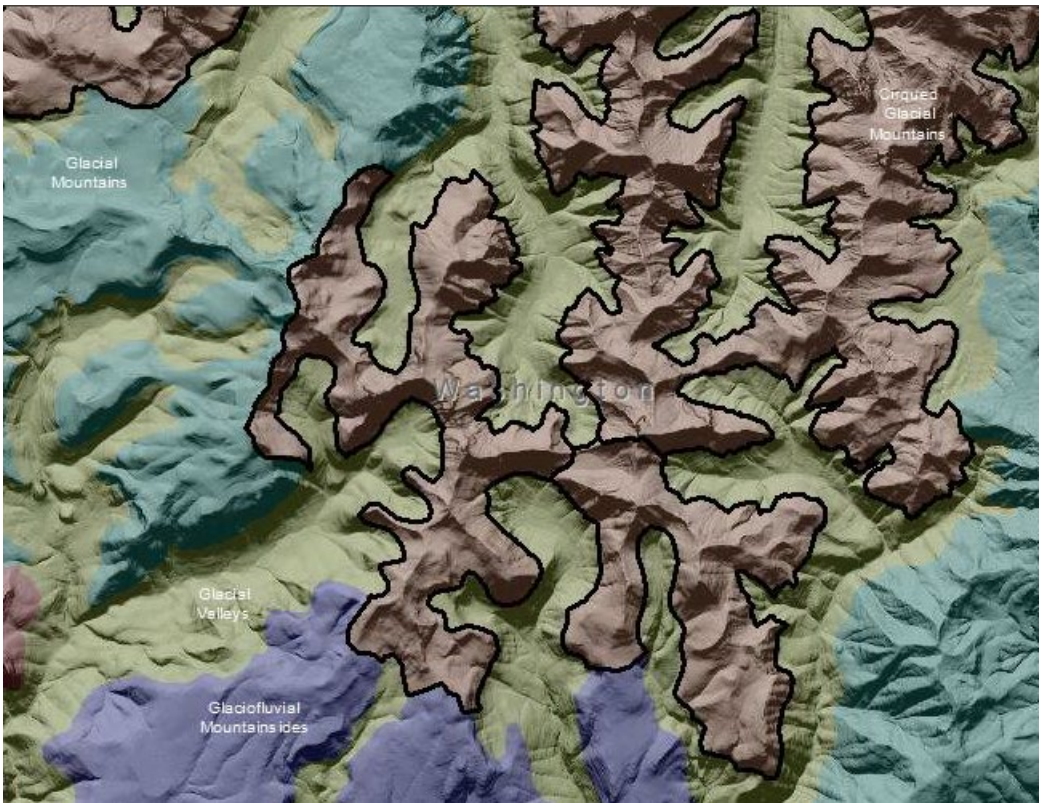
Cascades Cirqued Glacial High Mountains

Terrain Class: Mountains - No one process responsible for construction of mountains. They can be uplifted, tectonic, subduction of plates, folding, uplift, up and down warping of the mantle, inflation of molten lower crustal (batholiths), etc. Erosion of mountain systems occurs over time. The rate of erosion is dependent on the geomorphic process, the underlying rock structure, and the climate, including both freeze thaw and the amount and intensity of precipitation and runoff. Mountains are further defined and distinguished based on morphology, including the pattern and density of drainages, depth of drainages, overall morphology of the area between the drainages, evidence of a strong imprint of a surficial process such as glaciation, and presence of visible underlying rock structure.

Mountains have simple to very complex forms that have arisen due to inherited rock structure, rock history, and are the net result of local to regional spatial scales of competing rates of upbuilding/uplift and downgrading/erosion. Mountains will have an inherited history from weathering and degradation of the underlying stack of earth materials that forms them. Vegetation, habitat, water interception, collection and transport will share a similar history in the same type of uplift and rock.

Landform Association: Cirqued Glacial Mountains



Cirqued Glacial Mountains are mountainous areas with lower relief than Cirqued Glacial High Mountains. They have obviously been sculpted by both current and past glaciation. Cirque features are semi-circular bowl like excavation in a hanging valley or the head of a valley. An aerial view of a cirque shows a horseshoe like shape with the open end of the shoe pointing away from the steep headwall and

surrounding side slopes. In the Cirqued Glacial Mountain Landform Associations, adjacent cirques have failed to coalesce into a basin and have formed spectacular arêtes and impressive relief in the sculpted mountainsides. These areas will lack the cirque lakes and meadows found in closed cirque basin landscapes.

This Landform Association has a limited spatial extent on National Forest System Lands.

Landtype Associations: Landtype Associations are formed by intersecting vegetation series or groups of vegetation series with Landform Associations.

Topography:
The following tables represent the average conditions for the Landform Association. Only lands within and adjacent to National Forest System Lands were mapped by this project. The entire EPA Level III Ecoregion is not covered by this mapping.

The percent of Landform Association (% of LfA) in bold in the table below refers to the percent of the Ecoregion represented by that Landform Association. The (% of LfA) numbers not in bold in the table below refer to the percent of each Landtype Association within the Landform Association.

Landform Association/Landtype Association	**Mean % Slope**	**Minimum Elevation (m)**	**Maximum Elevation (m)**	**Mean Elevation (m)**	**% Northerly Aspect (226° - 134°)**	**% Southerly Aspect (135° - 225°)**
Cirqued Glacial Mountains	**52**	**1208**	**1727**	**1476**	**73%**	**27%**
Cirqued Glacial Mountains, Grand Fir	39	1330	1609	1531	58%	42%
Cirqued Glacial Mountains, Ice and Snowfields	45	1893	2382	2153	99%	1%
Cirqued Glacial Mountains, Mountain Hemlock	45	1274	1733	1519	80%	20%
Cirqued Glacial Mountains, Mountain Hemlock - Pacific Silver	59	1113	1672	1395	78%	22%
Cirqued Glacial Mountains, Mountain Hemlock - Parkland	58	1481	2138	1813	36%	64%
Cirqued Glacial Mountains, Mountain Hemlock - Subalpine Fir	50	1632	1969	1813	32%	68%
Cirqued Glacial Mountains, Pacific Silver Fir	44	1037	1548	1278	73%	27%
Cirqued Glacial Mountains, Pacific Silver Fir - Mountain Hemlock	52	1245	1785	1547	57%	43%
Cirqued Glacial Mountains, Pacific Silver Fir - Parkland	71	1142	1721	1427	71%	29%
Cirqued Glacial Mountains, Pacific Silver Fir - Subalpine Fir	51	1354	1800	1574	44%	56%
Cirqued Glacial Mountains, Pacific Silver Fir - Western Hemlock	61	983	1605	1296	72%	28%
Cirqued Glacial Mountains, Parkland	47	1500	1991	1774	83%	17%
Cirqued Glacial Mountains, Parkland - Mountain Hemlock	63	1237	1933	1714	89%	11%
Cirqued Glacial Mountains, Rock	58	1715	2367	2066	81%	19%
Cirqued Glacial Mountains, Rock - Parkland	52	1532	2203	1897	84%	16%
Cirqued Glacial Mountains, Subalpine Fir	42	1690	1942	1838	29%	71%
Cirqued Glacial Mountains, Western Hemlock	64	870	1428	1133	69%	31%
Cirqued Glacial Mountains, Western Hemlock - Pacific Silver Fir	39	1292	1565	1459	63%	37%

Climate:

Landtype Assocation	Mean Annual Precipitation (mm)	Mean Annual Temperature °C	AET/PET Ratio July, Aug, Sept
Cirqued Glacial Mountains	**2041**	**5**	**0.46**
Cirqued Glacial Mountains, Grand Fir	1124	5	0.36
Cirqued Glacial Mountains, Ice and Snowfields	2149	1	0.21
Cirqued Glacial Mountains, Mountain Hemlock	1943	4	0.44
Cirqued Glacial Mountains, Mountain Hemlock - Pacific Silver Fir	2550	5	0.52
Cirqued Glacial Mountains, Mountain Hemlock - Parkland	1937	3	0.41
Cirqued Glacial Mountains, Mountain Hemlock - Subalpine Fir	1599	3	0.31
Cirqued Glacial Mountains, Pacific Silver Fir	2203	5	0.54
Cirqued Glacial Mountains, Pacific Silver Fir - Mountain Hemlock	1576	4	0.45
Cirqued Glacial Mountains, Pacific Silver Fir - Parkland	2568	5	0.51
Cirqued Glacial Mountains, Pacific Silver Fir - Subalpine Fir	1281	4	0.39
Cirqued Glacial Mountains, Pacific Silver Fir - Western Hemlock	2367	5	0.54
Cirqued Glacial Mountains, Parkland	1846	3	0.36
Cirqued Glacial Mountains, Parkland - Mountain Hemlock	1268	4	0.34
Cirqued Glacial Mountains, Rock	1909	2	0.25
Cirqued Glacial Mountains, Rock - Parkland	1944	2	0.23
Cirqued Glacial Mountains, Subalpine Fir	1152	3	0.34
Cirqued Glacial Mountains, Western Hemlock	1926	6	0.48
Cirqued Glacial Mountains, Western Hemlock - Pacific Silver Fir	1117	5	0.37

The ratio of Actual Evapotranspiration to Potential Evapotranspiration (AET/PET) is used as a broad-scale indicator of potential drought stress. We obtained modeled actual and potential evapotranspiration datasets from the Numerical Terradynamic Simulation Group at the University of Montana (http://www.ntsg.umt.edu/project/mod16) for a 30 year climate average. AET/PET ratio in the table above is based on a scale of zero to one. A value closer to 1 means the vegetation is transpiring close to its potential. A value farther from 1means that the Actual Evapotranspiration is below potential based on this climatic zone (Ringo, et. al. 2016 in draft).