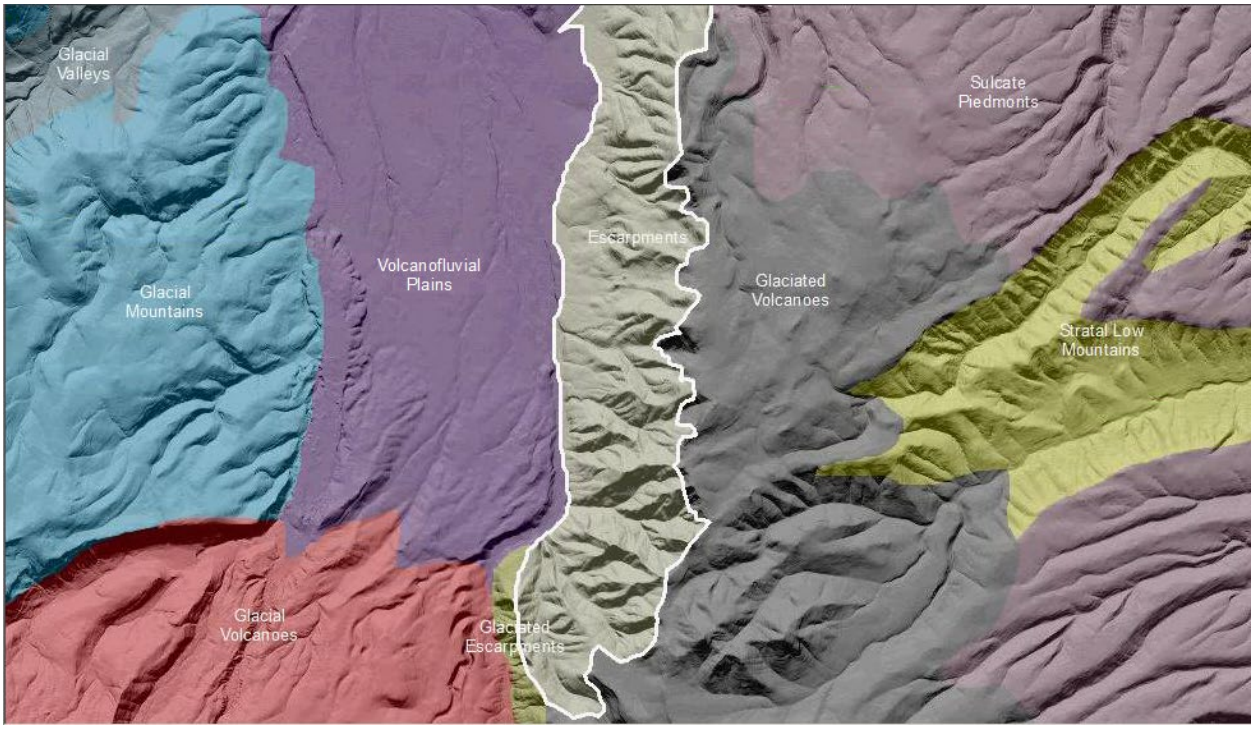
Blue Mountains Escarpments

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: Escarpments



Escarpments are linear with a unique narrow range of aspect. The slopes are at or greater than the angle of repose and underlain with bedrock. They have significant relief, meet the toe slope at steep angles and generally face a lower angle landscape. They are the result of quaternary faults or a fault scarp line that has weathered back from the fault line presenting a steeply sloping mountain front. The escarpment can also be the product of a tectonic lift or the erosion of a river meander cutting into the

mountainside. Competent bedrock overlain by a less competent formation if eroded will show the structural differences that are expressed as an escarpment.

The hydrology on these steep and cliffy landforms is flashy and debris flows are common. The soils on the steep slopes are rocky with the few pockets of soil on benches. These pockets support vegetation and habitat for predator and prey species adapted to a vertical environment.

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	**% of LfA**	**Mean % Slope**	**Minimum Elevation (m)**	**Maximum Elevation (m)**	**Mean Elevation (m)**	**% Northerly Aspect (226° - 134°)**	**% Southerly Aspect (135° - 225°)**
Escarpments	**0.4%**	**41**	**1123**	**1701**	**1395**	**83%**	**17%**
Escarpments, Douglas-Fir	16.7%	33	1076	1588	1317	97%	3%
Escarpments, Douglas-Fir - Ponderosa Pine	3.7%	31	1291	1591	1447	92%	8%
Escarpments, Douglas-Fir - Water	0.9%	18	1230	1466	1356	71%	29%
Escarpments, Grand Fir-White Fir	49.5%	39	1178	1844	1472	85%	15%
Escarpments, Grand Fir-White Fir - Ponderosa Pine	1.0%	52	1045	1761	1363	66%	34%
Escarpments, Grand Fir-White Fir - Subalpine Fir	2.4%	56	1025	1783	1465	88%	12%
Escarpments, Ponderosa Pine	12.3%	33	1107	1660	1323	75%	25%
Escarpments, Ponderosa Pine - Douglas-Fir	2.2%	52	1016	1704	1317	64%	36%
Escarpments, Ponderosa Pine - Grand Fir-White Fir	1.6%	48	1112	1614	1382	62%	38%
Escarpments, Ponderosa Pine - Shrub-Steppe	1.8%	52	947	1608	1228	58%	42%
Escarpments, Ponderosa Pine - Western Juniper	1.2%	28	1337	1578	1444	73%	27%
Escarpments, Subalpine Fir	2.4%	57	1148	1739	1474	98%	2%
Escarpments, Subalpine Fir - Douglas-Fir	1.5%	50	969	1713	1312	89%	11%
Escarpments, Subalpine Fir - Grand Fir-White Fir	2.7%	58	995	1762	1418	85%	15%

Climate:

Landform Association/Landtype Association	**Mean Annual Precipitation (mm)**	**Mean Annual Temperature °C**	**AET/PET Ratio July, Aug, Sept**
Escarpments	**659**	**7**	**0.25**
Escarpments, Douglas-Fir	596	7	0.29
Escarpments, Douglas-Fir - Ponderosa Pine	376	7	0.13
Escarpments, Douglas-Fir - Water	562	8	0.26
Escarpments, Grand Fir-White Fir	708	6	0.25
Escarpments, Grand Fir-White Fir - Ponderosa Pine	793	7	0.34
Escarpments, Grand Fir-White Fir - Subalpine Fir	738	6	0.29
Escarpments, Ponderosa Pine	561	7	0.24
Escarpments, Ponderosa Pine - Douglas-Fir	769	7	0.32
Escarpments, Ponderosa Pine - Grand Fir-White Fir	778	6	0.26
Escarpments, Ponderosa Pine - Shrub-Steppe	729	7	0.17
Escarpments, Ponderosa Pine - Western Juniper	388	7	0.09
Escarpments, Subalpine Fir	858	6	0.29
Escarpments, Subalpine Fir - Douglas-Fir	719	7	0.31
Escarpments, Subalpine Fir - Grand Fir-White Fir	733	6	0.31

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).