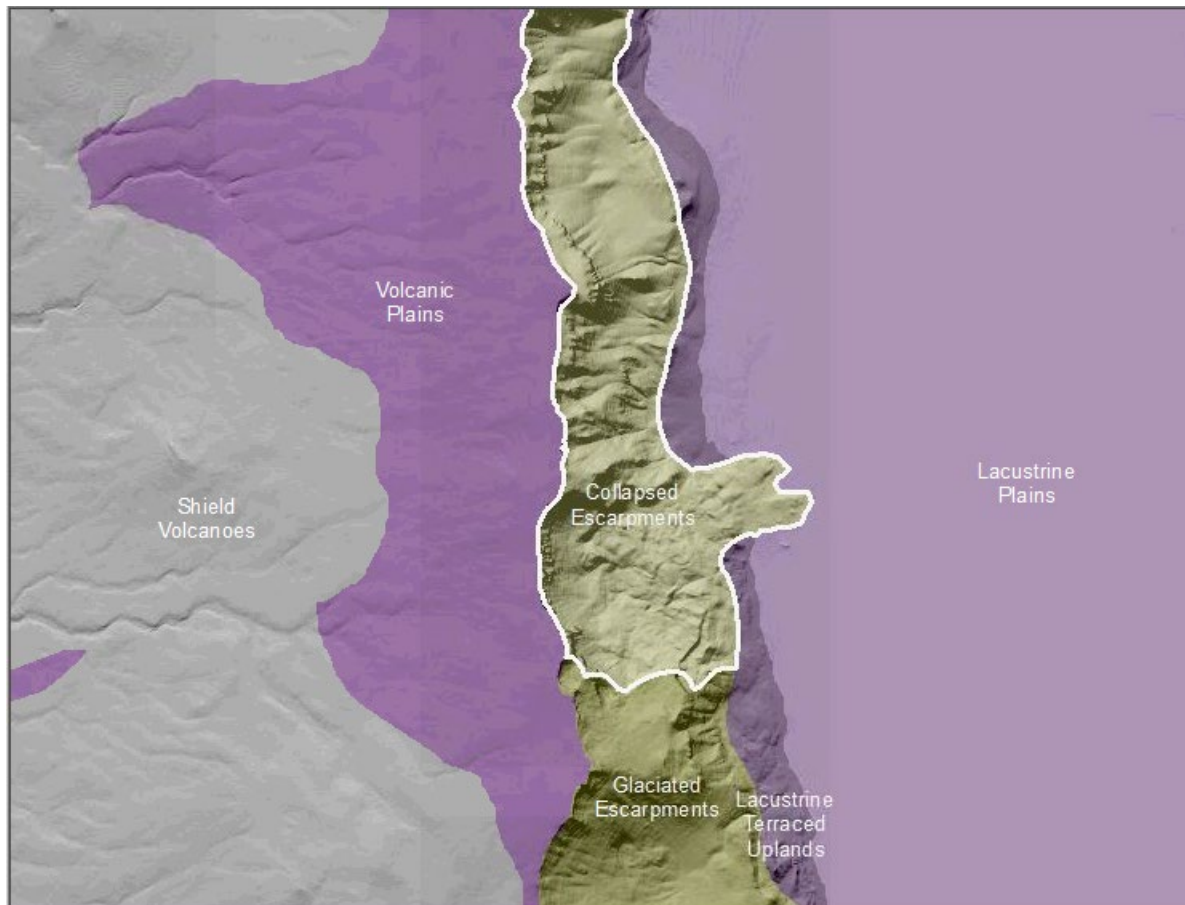


Eastern Cascades Collapsed Escarpments

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: Collapsed Escarpments



Collapsed Escarpments are escarpments where many large landslides have collapsed large areas of the escarpments. The landslides may be from the pre-historic past or recent and current developments. The landslide areas have a hummocky appearance and water routing through this landscape may be irregular due to recent and on-going slope failure with its accompanying surface and subsurface drainage diversions and impoundments. The upper area of intact bedrock are represented by a linear rock exposure. 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 angle 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. The soils on the landslide area are variable with deep pockets developing from the enhanced water storage.

This Landform Association is rare 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°) |
|-------------------------------------------------------------|-------------|--------------|-----------------------|-----------------------|--------------------|----------------------------------|----------------------------------|
| Collapsed Escarpments | 0.3% | 35 | 1377 | 1837 | 1570 | 80% | 20% |
| Collapsed Escarpments, Grand Fir-White Fir | 52.7% | 40 | 1420 | 2042 | 1731 | 83% | 17% |
| Collapsed Escarpments, Grand Fir-White Fir - Ponderosa Pine | 2.7% | 45 | 1392 | 2032 | 1695 | 98% | 2% |
| Collapsed Escarpments, Ponderosa Pine | 13.0% | 46 | 1326 | 1962 | 1585 | 80% | 20% |
| Collapsed Escarpments, Ponderosa Pine - Grand Fir-White Fir | 2.7% | 26 | 1432 | 1772 | 1606 | 91% | 9% |
| Collapsed Escarpments, Ponderosa Pine - Shrub-Steppe | 6.0% | 39 | 1319 | 2065 | 1508 | 83% | 17% |
| Collapsed Escarpments, Ponderosa Pine - Western Juniper | 1.1% | 37 | 1504 | 1814 | 1647 | 41% | 59% |
| Collapsed Escarpments, Shrub-Steppe | 1.5% | 41 | 1313 | 1642 | 1423 | 91% | 9% |
| Collapsed Escarpments, Shrub-Steppe - Western Juniper | 1.2% | 43 | 1322 | 1610 | 1426 | 78% | 22% |
| Collapsed Escarpments, Western Juniper | 8.0% | 26 | 1382 | 1654 | 1499 | 79% | 21% |
| Collapsed Escarpments, Western Juniper - Ponderosa Pine | 9.3% | 18 | 1405 | 1688 | 1488 | 77% | 23% |
| Collapsed Escarpments, Western Juniper - Salt Desert | 1.8% | 14 | 1265 | 1388 | 1303 | 73% | 27% |

Climate:

| Landtype Association | Mean Annual Precipitation (mm) | Mean Annual Temperature °C | AET/PET Ratio July, Aug, Sept |
|-------------------------------------------------------------|-------------------------------------------|---------------------------------------|------------------------------------------|
| Collapsed Escarpments | 444 | 8 | 0.11 |
| Collapsed Escarpments, Grand Fir-White Fir | 529 | 7 | 0.13 |
| Collapsed Escarpments, Grand Fir-White Fir - Ponderosa Pine | 449 | 7 | 0.07 |
| Collapsed Escarpments, Ponderosa Pine | 424 | 7 | 0.11 |
| Collapsed Escarpments, Ponderosa Pine - Grand Fir-White Fir | 451 | 8 | 0.08 |
| Collapsed Escarpments, Ponderosa Pine - Shrub-Steppe | 418 | 8 | 0.14 |
| Collapsed Escarpments, Ponderosa Pine - Western Juniper | 492 | 7 | 0.11 |
| Collapsed Escarpments, Shrub-Steppe | 373 | 8 | 0.10 |
| Collapsed Escarpments, Shrub-Steppe - Western Juniper | 383 | 8 | 0.12 |
| Collapsed Escarpments, Western Juniper | 427 | 8 | 0.11 |
| Collapsed Escarpments, Western Juniper - Ponderosa Pine | 453 | 8 | 0.10 |
| Collapsed Escarpments, Western Juniper - Salt Desert | 272 | 9 | 0.04 |

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.ntsug.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 1 means that the Actual Evapotranspiration is below potential based on this climatic zone (Ringo, et. al. 2016 in draft).