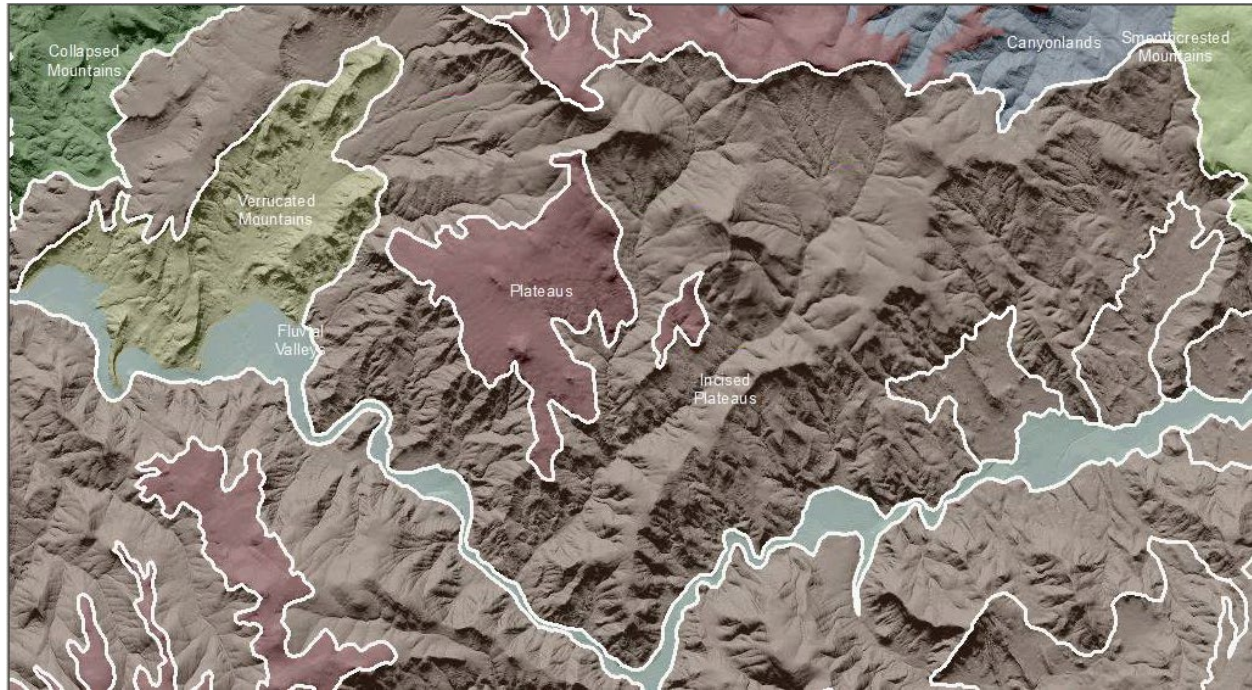


Cascade Incised Plateaus

Plateaus in the Pacific Northwest are predominantly underlain by stacked flows of the Columbia River Basalts and form extensive elevated plains bounded on one or more sides by steep slopes hundreds of feet above adjoining areas. Plateaus are differentiated from each other by the most-evident surficial processes of alteration.

Landform Association: Incised Plateaus:



The Columbia River and associated basalt flows constitute one of the largest flood basalt flows in the world. The basalt flows emanated from a series of fractures in the earth surface. Initially they created a broad, nearly level plateau up to 8000 to 9000 feet thick that covered an area of 77,000 square miles across eastern Oregon and southwest Washington (Orr and Orr, 2012). Much of the plateau is without a perennial source of water.

Incised refers to landscapes and landforms that retain their outlines and the majority of their mass but are experiencing an initial alteration of form due to weathering. Depending on stage of erosion, plateaus will manifest varying degrees of incision (Figure 1). Initially water is transmitted directly below ground through a series of fractures in the flow. As the original basalt flow weathers, surface runoff increases. Fluvial erosion processes initiate incision and ephemeral stream channel formation.

Hydropedological Model

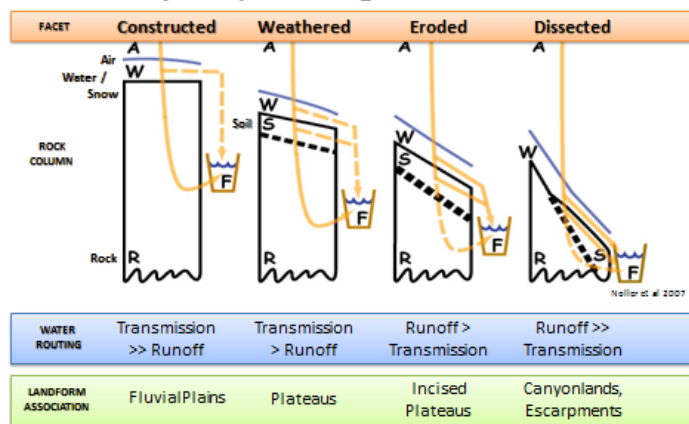


Figure 1: Noller depiction of landform relationships based on degree of weathering and erosion and runoff from the landscape.

With increased weathering and erosion, runoff of snowmelt and precipitation dominates and deep incisions occur at weak points in the basalt flows. The plateau becomes highly incised, eventually giving way to deep incision of canyons which headcut back into the plateaus over time.

This Landform Association has an abundant 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°)
Incised Plateaus	0.6%	26	517	839	702	69%	31%
Incised Plateaus, Developed	0.5%	4	638	691	677	86%	14%
Incised Plateaus, Developed - Douglas-Fir - mix	0.8%	40	443	651	545	49%	51%
Incised Plateaus, Douglas-Fir	4.2%	19	433	801	699	71%	29%
Incised Plateaus, Douglas-Fir - Grand Fir	1.2%	31	317	638	547	60%	40%
Incised Plateaus, Grand Fir	14.4%	25	136	461	310	45%	55%
Incised Plateaus, Grand Fir - Western Hemlock	1.4%	23	336	735	543	32%	68%
Incised Plateaus, Grand Fir-White Fir	0.5%	24	606	932	806	75%	25%
Incised Plateaus, Grand Fir-White Fir - Western Hemlock	14.7%	20	697	983	875	70%	30%
Incised Plateaus, Pacific Silver Fir - Western Hemlock	1.4%	6	1058	1191	1112	94%	6%
Incised Plateaus, Western Hemlock	57.8%	27	396	834	644	72%	28%
Incised Plateaus, Western Hemlock - Developed	1.3%	59	483	851	627	72%	28%
Incised Plateaus, Western Hemlock - Grand Fir	0.9%	44	326	642	433	78%	22%
Incised Plateaus, Western Hemlock - Grand Fir-White Fir	1.0%	49	471	801	614	85%	15%

Climate:

Landform Association/Landtype Association	Mean Annual Precipitation (mm)	Mean Annual Temperature °C	AET/PET Ratio July, Aug, Sept
Incised Plateaus	1447	10	0.54
Incised Plateaus, Developed	1596	11	0.42
Incised Plateaus, Developed - Douglas-Fir - mix	1125	11	0.53
Incised Plateaus, Douglas-Fir	1759	10	0.48
Incised Plateaus, Douglas-Fir - Grand Fir	1353	10	0.49
Incised Plateaus, Grand Fir	1889	11	0.56
Incised Plateaus, Grand Fir - Western Hemlock	1366	10	0.46
Incised Plateaus, Grand Fir-White Fir	1184	10	0.46
Incised Plateaus, Grand Fir-White Fir - Western Hemlock	1253	10	0.60
Incised Plateaus, Pacific Silver Fir - Western Hemlock	1388	9	0.60
Incised Plateaus, Western Hemlock	1706	10	0.53
Incised Plateaus, Western Hemlock - Developed	1163	10	0.55
Incised Plateaus, Western Hemlock - Grand Fir	1421	11	0.51
Incised Plateaus, Western Hemlock - Grand Fir-White Fir	1114	11	0.59

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