

# **Designing Sustainable Landscapes: Slope settings variable**

## ***A project of the University of Massachusetts Landscape Ecology Lab***

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### *With support from:*

- North Atlantic Landscape Conservation Cooperative (US Fish and Wildlife Service, Northeast Region)
- Northeast Climate Science Center (USGS)
- University of Massachusetts, Amherst



### *Reference:*

McGarigal K, Compton BW, Plunkett EB, DeLuca WV, and Grand J. 2017. Designing sustainable landscapes: slope settings variable. Report to the North Atlantic Conservation Cooperative, US Fish and Wildlife Service, Northeast Region.

### General description

Slope is one of several ecological settings variables that collectively characterize the biophysical setting of each 30 m cell at a given point in time (McGarigal et al 2017). Slope gives the percent slope at each cell (**Fig. 1**). High slopes indicate a propensity for gravity-induced physical disturbance (e.g., talus slopes), which can limit plant development. Slope ranges from 0% for flat areas to theoretically infinity for absolutely vertical cliffs, though the actual maximum occurring in our landscape is 440%.

### Use and interpretation of this layer

This ecological settings variable is used for the similarity and connectedness ecological integrity metrics.

This layer carries the following assumptions:

- The digital elevation model is accurate. Although this seems to be true at broader scales, the NED includes fine-scale rectilinear artifacts (see **Fig. 1**).
- Slopes at the scale of 30 m pixels are ecologically meaningful. Short slopes may be missed, and the actual slope of very steep cliffs may be inaccurate.

### Derivation of this layer

#### Data source

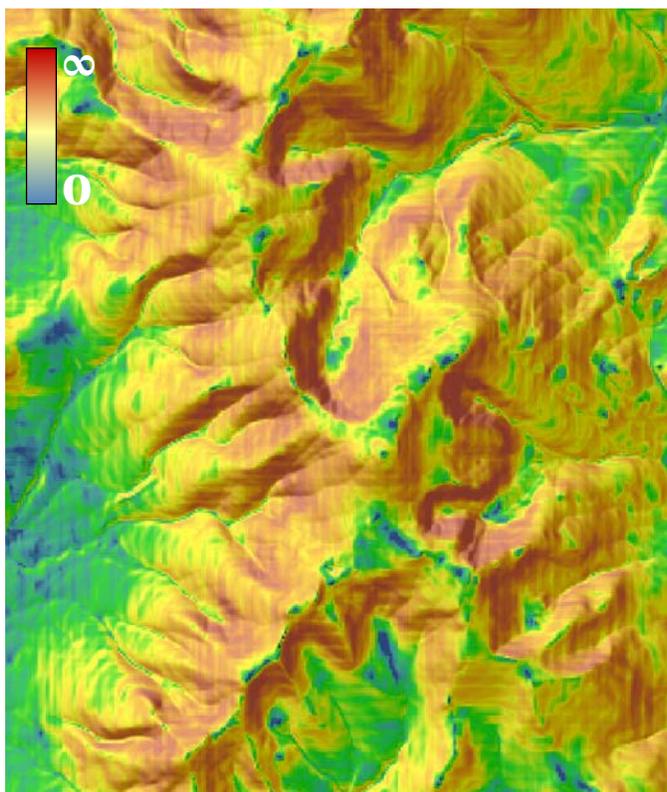
- Digital elevation model (DEM). We used the National Elevation Dataset's (NED) 10 m DEM, resampled to 30 m.

#### Algorithm

Percent slope is simply  $100 \times \text{rise/run}$  for each cell.

### GIS metadata

This data product is distributed as a geoTIFF raster (30 m cells). The cell values are continuous, representing percent slope. This data product can be found at McGarigal et al (2017).



**Figure 1.** Percent slope (log-scaled for clearer display) for a portion of the Presidential Range, New Hampshire.

## **Literature Cited**

McGarigal K, Compton BW, Plunkett EB, DeLuca WV, and Grand J. 2017. Designing sustainable landscapes products, including technical documentation and data products. [https://scholarworks.umass.edu/designing\\_sustainable\\_landscapes/](https://scholarworks.umass.edu/designing_sustainable_landscapes/)