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Interaction between forest and landslide activity along new highways in Kumaun Himalaya,

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ABSTRACT

Forest cover and landslide activity were surveyed along two hill roads crossing steep hillsides in the Kumaun Himalaya. The Kilbury Road is cut through reserved forest (29°24'N 79°28'E, altitude 2100 m). The Almora Bypass crosses a suburban fringe (29°16'N 79°40'E, altitude 1650 m). Tree canopy cover upslope of the road cut was 56.8% along the Kilbury Road and 14.1% along the Almora Bypass. Tree canopy cover downslope of the roadbed was 35.7% and 7.6% respectively. Ground vegetation cover downslope of the road was also much reduced. In 1990 (and 1985), landslides affected 80.9% (76.5%) of the roadcut in the forest and 42.5% (43.1%) along the suburban roadcut. Statistical correlation of forest cover and landslide attributes recorded for each 200 m reach of roadbed demonstrate that, in the suburban case study, forest cover correlates positively with landslide activity—because forest survives mainly on sites which are too steep and unstable for development. However, in reserved forest, negative correlations link forest cover and landslide activity. Correlation of the ratio between forest cover downslope and upslope of the road with environmental and landslide activity attributes produces little that is significant from the combined or Almora data sets. However, along the undeveloped forest road, low ratios, indicating a greater proportional reduction of tree cover downslope of the road, are significantly associated with steeper slopes, higher roadcuts, increased slumping onto the roadbed, and increased undermining of the roadcut by landslide and erosional processes.