A well-accepted idea in geomorphology is that landforms control the type and distribution of biological habitat. However, the linkages between geomorphology and ecology remain poorly understood. In rivers, the geomorphic template controls the hydraulic environment, partly shaping the river ecosystem. But what processes shape the geomorphic template? Here, I examine how two hillslope processes dominant in the Oregon Coast Range, debris flows and deep-seated landslides, affect valley floor width and channel slope, key components of the geomorphic template in riverine ecosystems. I then investigate how patterns in potential salmon habitat differ between streams dominated by deep-seated landslides and streams dominated by debris flows. I show that terrain influenced by deep-seated landslides exhibits (1) valley widths that are more variable throughout the network but less locally variable, (2) more variable channel slopes, and (3) more potential salmon habitat as well as significantly more connectivity between habitat types.