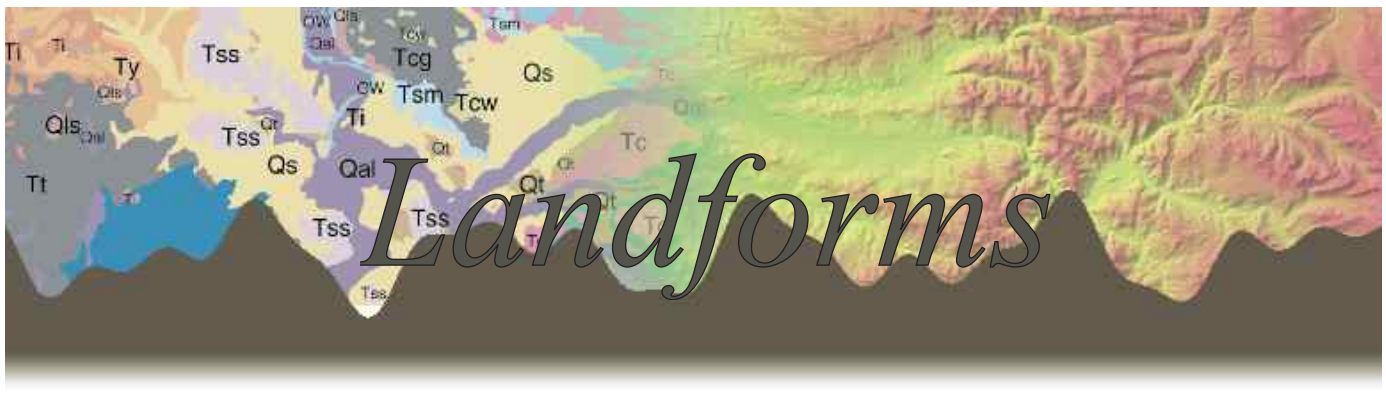
Coast Range. Highly productive, rain-drenched coniferous forests cover the low mountains of the Coast Range. Douglas-fir plantations are prevalent on the intensively logged and managed landscape.
Photo: Jim Omernik[65]

Willamette Valley. The valley is distinguished from the Coast Range and Cascade mountains by lower precipitation, less relief, and a different mosaic of vegetation. Productive soils and a temperate climate make it one of the most important agricultural areas in Oregon. More than two-thirds of all Oregonians live here.
Photo: Jim Omernik[65]

Cascades. The western slope of the Cascades is characterized by steep ridges and river valleys and both dormant and active volcanoes. Its moist climate supports highly productive coniferous forests.
Photo: Jim Omernik[65]



The movement of oceanic plates, volcanoes erupting millions of years ago, giant floods roaring up the valley as the continental glaciers melted, all seem remote and disconnected from our day-to-day activities and decisions. Yet these are the forces that created the Willamette Basin, formed the soils that allow for today's productive agriculture, shaped the mountains that give the basin its unique character, and resulted in the environmental conditions to which people respond in deciding where to live and work. The physical setting of the basin, the basic form and nature of the land, has much to do with how land is and can be used. In this chapter we describe three basic aspects of the physical setting: geology, soils, and the elevation profile.

The collision of the Juan De Fuca tectonic plate off the coast of Oregon with the North America tectonic plate is the dominant geological force in the region. As the denser, oceanic plate slides under the lighter continental coast, sedimentary rocks have piled up on the edge of the continent forming the Coast Range mountains. Partial melting of the sinking plate, at the high temperatures that occur deep in the earth's crust, feeds a system of volcanoes that rise inland from the plate margin, creating the Cascade Range mountains. The Coast Range consists largely of sandstones and siltstones, intermixed with older volcanic rocks. Sandstone and siltstone readily erode, producing fine, easily moved stream sediments. The volcanic rocks of the high Cascades are newer and more resistant to erosion, and thus rise to higher elevations than mountains in the Coast Range. Newer volcanic rock can support deep valleys with steep slopes. Weathered volcanics, by contrast, are mechanically weak and prone to landslides. They produce very fine, clay-rich soils, susceptible to slow-moving earth flows.

Between the Coast and Cascade Ranges, the valley floor is filled with more recent sedimentary deposits left by major floods. In particular, 15,500 to 13,000 years ago, ice dams formed large lakes in the Missoula Valley, Montana. When these ice dams broke periodically, huge volumes of water flowed down the Columbia River and backed up into the Willamette Valley, filling the valley with fine, lake sediments. The result was a fairly flat, poorly drained valley floor surrounded by steep-sided mountains. Closer to the river, these lake sediments were covered by coarser, alluvial sediments deposited during subsequent Willamette River flood events. These coarser, better-drained soils provide some of the best lands for agricultural production, a characteristic of the land which formed a strong attraction to the early EuroAmerican settlers of the mid-19th century.