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Soils of the Puget Sound Region

Soil – (i) The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (ii) The unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of genetic and environmental factors of: microorganisms, conditioned by relief, acting on parent material over a period of time. A product-soil differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics. (Glossary of Soil Science Terms, 2001, Soil Science Society of America)

There are five soil forming factors, parent material, climate, organisms, topography and time. These factors interact and produce unique sets of soil properties which are recognized as individual soil series. The USDA-Natural Resources Conservation Service is responsible for identifying and mapping soil series, their properties and developing interpretations for their use.

As these soil forming factors change a new soil can develop. The soils in the Puget Sound Region have many differences in soil forming factors which result in a wide variety of soil series.

Parent Material – Parent material is the unconsolidated organic and mineral material in which soil formation begins. In the Puget Sound lowlands glacial deposits from the last Pleistocene glaciation (12,000 to 15,000 years ago) are the major parent material. Included in these deposits are dense glacial till (hardpan), glacial outwash (clean sands and gravels) and glacial lake sediments (silts and clays). Other parent materials in the region are recent alluvium (floodplain material) deposited after the glaciers receded, residual bedrock in the Olympics and Cascades, and various deposits of

volcanic ash. Each of these parent materials will produce different soil series.

Climate – Precipitation and temperature are the major climatic factors that influence soil development. The amount of effective precipitation will determine how parent material weathers, how much water is available for plant growth, and can transport minerals. Temperature will affect the types and rate of plant growth and also affects how parent material weathers. Both temperature and precipitation have a wide range in the Puget Sound region as you go from sea level to the crest of the Cascades and from the Canadian border to Olympia.

Topography – Topography influences precipitation and temperature in soil formation. It will affect drainage and runoff both on the surface and internally in a soil. Aspect, whether south facing or north facing, affects temperature. Topography varies a great deal from nearly level terraces and floodplains in the lowlands to steep slopes in the Cascades.

Organisms – Both plants and animals work in developing soils by adding organic matter, decomposing organic matter, recycling nutrients, mixing the soil and helping with aeration. Dependent on the other soil forming factors, the Puget Sound region has a great variety of plants and animals living in and on the soil. These range from grass prairies to coniferous and deciduous forests.

Time – Time is the factor that affects soil horizon development. The longer the different soil forming factors have influenced each other the greater the development of soil horizons and soil profiles. The soils in the Puget Sound region are relatively young. Due to the glaciation soils have developed in the last 12,000 to 15,000 years. There are also younger soils due to flood events and volcanic events that have taken place after the glaciers receded.

Soils of the Puget Sound Region

The major differences in soil forming factors between the soils found in the Puget Sound region and those found south of Chehalis are in parent material and time. Due to the glaciation there are unique parent materials such as glacial till and glacial outwash that are not found south of Chehalis. The soils south of Chehalis are also much older. Again without the disturbance of the last glaciation the soils have had longer to develop and weather. In general, the soils have well defined horizons, profiles, and more clay present.

To learn more about the soils in your area, find a copy of the NRCS soil survey for your county. Each survey goes into more detail on the soil formation processes and soil forming factors in the county along with descriptions and interpretations of individual soil series.

From the Surface Down, An Introduction to Soil Surveys For Agronomic Use (USDA-NRCS publication), explains about soils, how they developed, their properties, and how soil surveys are made and used. (soils.usda.gov/education/resources/k-12/)

There are also a number of websites to checkout to learn more about soils.

www.puyallup.wsu.edu/soilmgmt/Soils.htm

This site has Soils of the Puget Sound Area, with slides and a discussion of soil formation in the area. By Dr. Craig Cogger, Washington State University, Cooperative Extension Soil Specialist

soils.usda.gov

A good general site for soils information.

soils.usda.gov/education/facts/formation.html

This site has a section on soil formation and classification and soil forming factors.

www.or.nrcs.usda.gov/pnw_soil/wa_reports.html

You can find on-line soil surveys at this site.

foodfarm.wsu.edu/Soils.htm

Washington State University site for soils information

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Written by Chuck Natsuhara, NRCS Soil Scientist, for Coastal Training Program. 2004.