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Limiting soil compaction

Soil compaction reduces rainfall infiltration, increases runoff that causes erosion, and decreases pore spaces in the soil that provide oxygen to plant roots and soil fauna. Compacted soil also physically hinders root development. It is imperative to consider soil compaction when planning projects.

Soil disturbance and compaction can be limited or prevented in a myriad of ways! Most importantly, start with a comprehensive site assessment before taking any action. Identify the areas with the highest quality ecological functions and work to cause no impact to these areas whatsoever. Consolidate activities such as staging and parking in already-disturbed areas that have low functional potential. Locate soil-compacting activities on rocky or sandy soils that are less susceptible to compaction; clay, loam or volcanic-influenced soils are more susceptible. Designate a single access route into impacted areas. Prior to start of construction, fence off protected areas (orange plastic temporary-barrier construction fencing usually works best), sign each area clearly, and walk the site with any contractors to identify which areas are off-limits. If saving individual trees, protect the root system from compaction. The [Low Impact Development Technical Guidance Manual for Puget Sound](#) (Puget Sound Action Team) recommends fencing off an area around each tree, of 1' radius for every 1" of tree diameter at chest height (~4.5').

Consider using low-impact machinery for equipment operations: small, rubber tracked machines are lighter and more precise than large machines. Work when the soil is dry if at all possible; wet soil is more susceptible to compaction. Walk the area with the equipment operators before work starts to clarify exactly where work is to be performed and which areas are off-limits. An entry route can be laid for equipment to limit compaction using boards or plastic tracking. A heavy duff or mulch layer can also serve to reduce compaction on an entry route.

Salvage topsoil if possible. Topsoil may not be useable if it contains invasive weed seeds or a large amount of woody debris, such as roots and stumps. Useable topsoil is a valuable resource that can be transported to a new location in a large load, preserving the soil structure and existing seed bank.

Weed removal is best performed during the dry season if possible – grubbing out the bulbous root masses of Himalayan blackberry, for example – in order to prevent runoff and soil erosion during rains. However, grubbing weeds is difficult when soil is too dry; weeding late in the spring while soil is still moist is often a happy medium. Consider employing a herd of goats or sheep to weed an area rather than a human crew. These animals cause less impact because they are lighter and often have a more delicate removal mechanism than people with hand tools. See the [Center for Invasive Plants' Weed Control Methods links](#) page for more information (www.weedcenter.org/management/control.htm#grazing). Plant as early in the rainy season as possible, to increase survival of the new plants and help establish soil-stabilizing roots before the heavy rains start. When planting on steep slopes, limit physical weight on the slope by using ropes to secure the crew.

Rainfall can compact a newly cleared area (pressure from individual raindrops hitting the soil surface pushes soil particles closer together, eliminates pore space and forms a seal that dramatically affects infiltration). Mulch all newly cleared areas to reduce soil compaction and erosion from rainfall, and to prevent soil compaction from foot traffic. We prefer to use mulch whenever possible because of all the wonderful benefits it imparts to the soil when breaking down (see our info sheet on [Mulches](#)). However, gravity limits the feasibility of mulch on some planting sites. See our [Links](#) webpage for more Low Impact Development websites.

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