1. Soil condition will determine the future success of new plantings.

   a. Soils that have good porosity and have been minimally disturbed.

      Cover soil with six to eight inches of wood chip mulch in advance of planting. Use deeper mulch for longer periods before planting. Pull mulch away to expose soil for plant installation. Spread excess mulch to open areas between plants.

      Benefits: weed suppression, passive soil improvement, avoid soil compaction during planting operations, soil moisture retention, and improved survival rates with stronger growth.

   b. Soils that have been highly disturbed and compacted.

      Provide mechanical disturbance to physically break up compacted soil. Use a backhoe or tractor mounted subsoiler to aerate soil 12 to 18 inches deep. Roto-tillers are not generally effective for correcting compaction. Use a spade fork for hand cultivation in small areas. For large installation, use soil test data to determine the need for and amount of organic amendment. Organic matter content in native soils is generally close to 5% by weight (10% by volume), with higher concentrations near the surface. Surface application of compost and wood chip mulch is often sufficient. Cover prepared soil immediately with erosion jute (especially for slopes) and / or wood chip mulch.

      Benefits: deeper rooting profile with greater plant survival, development, and drought tolerance.


2. Planting methods will affect future plant performance.

   a. "Disturb" root balls enough to so roots are spread out into planting soil.

   b. Do not bury the trunks of trees or large woody shrubs.

      Install plants so soil covers original root boundary and does not bury any of the above ground stem or trunk tissue. Planting too deep - burying trunks and stems with soil impairs development and is a leading cause of mortality in newly planted trees and larger shrub species. This is less of an issue on species that form thickets, such as snowberry or nootka rose.

      Benefits: strong establishment, good vigor, and better drought resilience.

      Planting details and more information:
      WSU FS047E Planting Trees and Shrubs in the Landscape at  [https://pubs.wsu.edu/Default.aspx](https://pubs.wsu.edu/Default.aspx)
3. Protect the critical root zone area of existing large trees.
   
a. Avoid soil disturbance near large trees.
   
   Digging, grading, and the addition of irrigation can have negative impacts to existing large trees. To maintain the health and benefits these trees provide, don't work too close to the trunks. As a general guideline, keep major disturbance such as grading or trenching outside a radius of 1 foot per inch of trunk diameter. New plantings should be kept to the out half of that radius. Water spray from sprinklers should not come in direct contact with tree trunks.
   
   Wood chip mulch four to six inches deep is beneficial to apply to the ground around the trees. Maintain about 1 foot of bare ground around the base of the trees so the trunks are not buried.
   
   It may be helpful to have large existing trees near high use areas evaluated by an ISA Certified Arborist for tree protection recommendations and tree risk assessment.
   
   Benefits: Avoid root damage that could lead to tree stress and decline. Maintain tree health and safety near areas of high human use and activity.
   
   More information:
   
   
   How to hire an arborist: [https://pnwisa.org/hire-an-arborist/](https://pnwisa.org/hire-an-arborist/)

4. Plant placement and combinations that can affect long-term performance.

   a. Consider mature size and spreading habit of plants near the edges of trails and other boundaries.
   
   Tall shrubs and wide spreading limbs too close to the edges impose a constant battle for clearance. Establish a distance from the edge to be kept free of these plants, and promote the growth of lower growing vegetation closer to the edge. Large growing trees such as Douglas fir, western red cedar, big leaf maple, or alder should set back from trails and spaced far enough apart to allow for their future growth and branch spread. As a general rule, they should be planted no closer than 10 to 15 feet from edges and other new trees.
   
   Benefits: Avoid future problems with root, trunk, and limb encroachment onto trails, parking areas, and similar boundaries. Reduce requirements for clearance pruning. Trees that are not overcrowded will have better growth and development.
   
   Reduce trailside pruning burdens. Improve visitor visual experience and sense of safety.
b. Combine ferns and groundcovers to improve vegetation density and establishment of slower growing woody species.

Use herbaceous companion plantings for better establishment of species that don't establish well in open exposures. Placing two or three herbaceous plants such as fringecups or woodland strawberry shoulder-to-shoulder with new salal can improve its establishment.

Oregon oxalis, woodland strawberry, fringecups, false Solomon's seal, and broadleaf sedum can be planted into woodchip mulch near the soil level without extra excavation and offer quick ground cover. They are a good choice for planting beneath large trees (Point 3 above). They are not likely to succeed without mulch, or where grass competition is fierce.


5. Plan for aftercare and monitoring during the first three years after planting to protect the investment.

a. Manage moisture during the first three years.

Sites that are established with eight inches of wood chip mulch and planted in the dormant season may establish without supplemental irrigation. Low volume emitter tubing applies water at soil level, minimizing moisture availability for weeds as compared with overhead sprinklers. Schedule for weekly deep soaking during the growing season the first year, reducing the frequency the following two years.

Benefits: Plants will be deeper rooted and more drought resilient for the long term with deep, infrequent irrigation in the first years. Higher establishment rates.

b. Manage grass competition during the first three years.

Suppress grasses and weeds early in the growing season to eliminate light and water competition. Achieve with mulch or trimming with weedeaters.

Benefits: New plants gain size and cover ground more rapidly without the competition.

More information:

How to Water New Plants and other irrigation information at Saving Water Partnership, www.savingwater.org
6. Pruning and vegetation management for trail sides and other edges.

   a. Train large growing trees near trails for overhead clearance and single leader while they are small.

      Gradually remove the lowest limbs while they are less than 2-inch diameter. Cut back to the trunk (no stubs!). Inspect for and correct co-dominant leaders next to trails and active use areas at the same time.

      Benefits: Early pruning takes less time and reduces or eliminate future pruning requirements and problems.

   b. Prune each species to follow its natural growth habit.

      Remove entire stems of large shrubs that lean across edges, cutting back to the soil level or point of origin at the center of the plant: western hazelnut, Indian plum, shrub willows, red-stem dogwood are examples of this group. Dig out creepers along trail edges instead of cutting: snowberry, thimble berry, roses. Use selective pruning with reduction and removal cuts for the tree-like shrubs: Red-flowering currant, ocean spray, ninebark, elderberry, and serviceberry are examples of this group.

      Plants that are stubbed off at edges with produce dense growth near the cuts. Some species decline in health from repeated shearing or stubbing.

      Benefits: Plants resume growth natural to their form and functions. Longer periods between pruning rotations. Plant longevity.

   More information: