Maintaining Soil Productivity during Forest or Biomass-to-Energy Thinning Harvests in the Western United States [electronic resource].

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Abstract: Forest biomass thinnings, to promote forest health or for energy production, can potentially impact the soil resource by altering soil physical, chemical, and/or biological properties. The extent and degree of impacts within a harvest unit or across a watershed will subsequently determine if site or soil productivity is affected. Although the impacts of stand removal on soil properties in the western United States have been documented, much less is known on periodic removals of biomass by thinnings or other partial cutting practices. However, basic recommendations and findings derived from stand-removal studies are also applicable to guide biomass thinnings for forest health, fuel reduction, or energy production. These are summarized as follows: (1) thinning operations are less likely to cause significant soil compaction than a stand-removal harvest, (2) risk-rating systems that evaluate soil susceptibility to compaction or nutrient losses from organic or mineral topsoil removal can help guide management practices, (3) using designated or existing harvesting traffic lanes and leaving some thinning residue in high traffic areas can reduce soil compaction on a stand basis, and (4) coarse-textured low fertility soils have greater risk of nutrient limitations resulting from whole-tree thinning removals than finer textured soils with higher fertility levels.