



**NORTHWEST
BIOSOLIDS**

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Unearthing
Sustainable
Solutions

FORESTRY

Fact Sheet

Biosolids recycling in the forest and on tree plantations encourages tree growth and increases yields, while enhancing forest understory vegetation to improve wildlife habitats.

SEEKING SOLUTIONS

In the Pacific Northwest, forest soils are rocky and contain relatively few nutrients. Forest productivity is often limited by lack of nutrients or water. While there is a push to preserve forests for wildlife and recreation, there is also increasing demand for wood and paper products for a continuing growing population. It is challenging to sustain working forests for timber production. Many of the area's old growth forests have been logged and are now managed for timber production for 40-60 year harvest cycles. To supply fiber to the pulp and paper industry and meet specialized consumer needs, diversification within the industry has introduced rapid-growing hybrid poplar plantations and Christmas tree plantations.

BENEFITS OF BIOSOLIDS

Biosolids applied to forestland helps trees grow and builds the soil foundation for productive forest ecosystems, including wildlife habitat. Improved soil tilth contributes to increased vegetation and healthier forest soils, reducing soil erosion into lakes and streams.



Douglas fir needles

HOW IT WORKS

Here are some of the ways biosolids improve our local forests:

- **Improved soil** - Forest soils have relatively small quantities of nutrients and organic matter, which can inhibit tree growth. Biosolids can play a valuable role by amending the soil, providing essential nutrients (especially nitrogen and phosphorus) and improving soil structure. The fine particles and organic matter found in biosolids can quickly enhance soil moisture and nutrient-holding characteristics. It's not just a short-term solution either, biosolids continue to offer a slow release of nutrients to the soil as the organic matter decomposes and site productivity may be permanently improved.
- **Increased timber production** - Most tree species grow faster when applied with biosolids; however, some respond dramatically while others show only a slight response. Douglas-fir, the Pacific Northwest's premier timber species, responds well, growing up to 75 percent faster when applied with biosolids.
- **Added understory benefits** - Within six months of applying biosolids to a conifer forest, understory plants have grown more vigorously and display a deeper green color than before the application. This understory vegetation is also typically higher in nutrients, serving a better food source and cover for wildlife. The lush understory is not only visually pleasing, but can be of commercial value to people who harvest ferns and other vegetation for floral arrangements.



RESEARCH & DEMONSTRATION

Universities around the Pacific Northwest like the University of Washington College of Forest Resources, University of British Columbia and Vancouver Island University, have researched biosolids forest application techniques, growth response, environmental effects, improved water quality, demonstrated soil improvement and reduction of erosion in forested watersheds.

WHAT'S HAPPENING

Utilities across the Pacific Northwest are managing successful biosolids forestry recycling programs. Some best practices to maintaining effective programs include carefully identifying and designing sites, maintaining buffers from waterways and using agronomic application rates.



Top: unapplied, Bottom: applied

Following are examples of how biosolids are used in forestry:

Timber production - Biosolids are used as a fertilizer in working forests throughout the Pacific Northwest in cooperation with both public and private forestland owners.

Hybrid poplars - The already rapid growth of hybrid poplars is enhanced when biosolids are applied to the soil, allowing tree harvests within seven to ten years of planting.

Christmas trees - Not only is Christmas tree growth increased following fertilization with biosolids, but tree color is a deeper shade of green and foliage is denser.

Decommissioning logging roads - Environmental organizations like Mountains to Sound Greenway Trust have used biosolids to help further their mission to maintain a flourishing green belt in Washington's Interstate-90 corridor. Forestland is being purchased to expand the state forest system and to recycle biosolids, generating more timber revenue for local schools, colleges and government services. Class A biosolids have been used to decommission old logging roads and re-establish natural slopes to forest ecosystems.

WOOD QUALITY

Does the increased width of tree growth rings following biosolids application affect the quality and strength characteristics of wood? While accelerated tree growth does reduce wood density by about 15 percent, studies have shown that this is similar to the density of wood grown on highly productive land or with commercial fertilizers and remains well within normal strength ranges for dimensional lumber.

Researchers believe that by combining biosolids applications with other forest management techniques (such as delayed thinning, pruning branches to increase clear wood, using application rates specially designed to achieve a specific growth response and timing applications during the growth cycle of the tree stand), wood quality can be enhanced.



Tree ring comparison

