



HYDRO- AND MULCH SEEDING

SWB1



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ADDRESSED
HAZARDSPROTECTED CRITICAL
INFRASTRUCTURE

▼ Primary functions and key services

(Bogunović & Filipović, 2023; Fan et al., 2023; Zeh, 2007)

- **Erosion control:** the application of mulch and fibres for seeding supports germination and growth rates and reduces soil displacement from wind and water. This prevents damage to embankments, slopes and roadside berms close to transport corridors, housing features, drainage or cable lines.
- **Rapid vegetation establishment:** seeds are evenly distributed, promoting uniform growth, which reduces sediment transport that may harm transport or drainage systems.
- **Soil stabilisation:** binders and cellulose-based additives improve soil cohesion, which is effective for re-vegetating embankments and against sediment runoff, reducing or hindering slope erosion.
- **Nutrient enrichment:** fertilisers and mycorrhizal inoculants enhance soil fertility.

▼ Site suitability, scale and coverage

Hydroseeding and mulch seeding can be customised based on site conditions, soil composition, and climate, and they are suitable to a range of climatological conditions, including arid and humid regions. (Reddy and Rajeswari, 2025)

Scale and coverage:

Hydroseeding was originally intended as an alternative to conventional dry seeding, only worth for large areas. However, as equipment and materials improved and thus the overall costs reduced, the scale of the intervention became more flexible. Hydroseeding is now a budget standard method, prices depending on accessibility and area sizes to be greened. (Zeh, 2007; Reddy and Rajeswari, 2025)

▶▶ What is it?

Hydro- and mulch seeding are efficient vegetation establishment techniques that involve spraying a slurry of seed, water, mulch, and other additives onto bare soil (Hydroseeding). Mulch seeding, however, uses hay or straw mulch only as a seed protection layer against gravitational and light wind forces or against drying out. These methods allow for rapid and uniform re-vegetation of disturbed landscapes, including slopes and bare surfaces, effectively controlling erosion and promoting new growth (Bogunović & Filipović, 2023; Zeh, 2007).

These techniques can be considered a NbS for soil sustainability as it mitigates soil degradation (depending on the duration of mulching, mulch type and management), with generally a positive effect on the majority of soil degradation processes and an impulse for grasses and herbal habitat establishment.



Hydroseeding application as overseeding and for greening bare spots in Vienna
Image Credit: [Michael Obriejetan, archive BOKU-IBLB], [2014]. Used with permission

Challenges this NbS addresses

- **Erosion**, especially on steep slopes and bare soils, as hydro seeding and mulch seeding prevent erosion by mulch and binding agents (Zeh, 2007). The mulch, however, improves germination conditions.

Ecosystem services

- ▶ **Soil quality enhancement:** degraded soils improved with soil enhancers and grass-herb-mixes.
- ▶ **Habitat and biodiversity increase:** Hydro seeding and mulch seeding have been identified as practices that enhance habitat and biodiversity. Particularly, these solutions support vegetation growth in both arid or high-rainfall conditions.



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▼ Cost-benefit profile

Hydroseeding prices range between € 0,2/m² at very favourable conditions (i.e., highway bank and cheapest seed mix) up to € 1,0/m² at very difficult conditions (i.e., skiing slopes in high mountain areas), where expensive, high quality seed mix are required (Oral information from hydroseeding service providers (A), price level 2020 and excluding VAT). The prices also depend on the site and conditions to be greened: the larger the area, the lower the price per m².

▼ Main components

- Uses a water-based slurry to distribute seeds and soil amendments evenly.
- Can include fertilisers, erosion control fibres, binding agents, and soil improvers.
- Applied with Hydroseeding equipment (hydro-seeders) to stabilise and efficiently green large areas with road access.
- Suitable for various terrains, including flat surfaces, slopes, and (steep) embankments.
- Hydro-mulching differs from Hydroseeding by incorporating a thicker mulch layer to enhance moisture retention and erosion control.
- Can be combined with other NbS, such as natural fibre supported erosion control or block stone installation.

Environmental impacts (EU taxonomy)

- Climate change mitigation
- Climate change adaptation
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems.

Example of installation

- ▶ **Borders Rail Hydroseeding** (Oliver Brown Ltd, n.d).
- ▶ **Location:** Scotland
- ▶ **Implemented by:** Oliver Brown Ltd.
- ▶ **Description and results:** The project was implemented in a 1,000,000 m² surface. The Hydroseeding was applied for the embankments of a railway corridor in its section close to a station. The Hydroseeding was implemented by using a road rail vehicle over the trains tracks. The total duration of the work extended to 6 weeks (Oliver Brown Ltd, n.d).

References

- Bogunović, I., Filipović, V. (2023). Mulch as a nature-based solution to halt and reverse land degradation in agricultural areas, *Current Opinion in Environmental Science & Health*, Volume 34, 100488, ISSN 2468-5844, <https://doi.org/10.1016/j.coesh.2023.100488>.
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- Zeh, H. (2007): Soil bioengineering Construction type manual. Eds. European Federation of Soil and Water Bioengineering, Verein für Ingenieurbiologie. Vdf Hochschulverlag AG: ETH Zürich.