

An Examination of Pipeline Site-Preparation Methods for Improving Plant Establishment ¹

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Abstract: Energy development and construction, specifically construction of natural gas pipelines, has expanded across western North Dakota within the Williston Basin (Bakken and Three Forks formations). This expansion challenges reclamation when vegetative plant establishment is limited post-installation. Limited vegetation establishment increases soil erosion, water runoff, and provides an environment with the potential to allow invasive plant species to encroach, resulting in numerous, expensive attempts of reseeding right-of-ways. This study examines three site-preparation methods near Williston, ND, and their effects on water runoff, sediment loss, and vegetation establishment under rainfall simulation during a severe drought in a semiarid climate. The treatments used in this study were wood-fiber hydromulch, land imprinting, wheat-straw crimping, the combination of hydromulch and imprinting, and bare ground (control), all on 2% and 5% slopes within the same catena. Rainfall simulations were completed in September 2020, and again in June 2021 to examine the treatments over time. Crimping straw, one the most economical options, was the only treatment which reduced runoff long-term with an equivalent depth of 0.7 cm of water, compared to 1.8 cm of water for the control. However, hydromulch and imprinting with hydromulch were the only treatments which reduced sediment load, both reducing erosion by over 58% when compared to the control. Plant establishment was not significant for any treatment, likely due to the severe drought conditions. Cover is necessary in times of drought when plants fail to establish, with straw crimping being the best option during an extended drought.

Additional Key Words: Hydromulch, Land imprinting, erosion, runoff, and rain simulation.

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 3. Work reported here was conducted at the Williston Research Extension Center at Williston, ND, near 48°07'18.0"N, 103°44'12.3"W.