Don't Be So Salty, Phase III: The Phytoremediation of Brine Contaminated Soils through the Use of Cover Crops, Halophytes, and Foxtail Barley

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Brine, a wastewater-byproduct from oil and gas drilling, can be 10 times saltier than seawater. About 98% of oilfield waste is brine. Brine from oil and gas drilling is the leading cause of soil and groundwater contamination. Brine spills are becoming more prevalent and contaminating more land. Phytoremediation is a remediation method that focuses on the interaction between plants, soil, and microorganisms in the soil. If these eight plants (alfalfa, barley, crested-wheatgrass, faba-beans, foxtail-barley, orac, rye, and salt-cress) are planted in four soil types with nine different salt levels and one chemical-treatment, then barley will survive the best because of its fibrous root system, high drought tolerance, and rapid organic-matter production. First, prepare pots depending on the salt level and soil type. Add 5-15 seeds depending on the plant type and add the correct amount of RO water. For the eight week growth-period, weigh the sample and measure the overall height. Add water if the weight is less than the constant weight, either 920(Trial-1) or 1120(Trial-2 and Trial-3) grams, unless water-levels are adjusted. After eight weeks, prepare the samples for testing by separating them into plant material and soil. Run the chloride and electro-conductivity tests on the soil and the biomass test on the plant material. Document final results. Phytoremediation has a future in remediation and will become necessary as more land is contaminated and more brine is produced. In conclusion, phytoremediation is the best remediation method to restore soil of high sodium chloride content without contributing to other issues.