Biosolids additions to marginal soils in Beaver County resulted in improved growth of coppice willow and agricultural crops.

BIOSOLIDS APPLICATIONS AND COPPICE-WILLOW ESTABLISHMENT IN SOLONETZIC SOILS

Client: Beaver Municipal Solutions

Beaver Municipal Solutions (BMS) owns and operates a Class II Sanitary Landfill east of Edmonton, near Ryley, Alberta. Much of the land surrounding the landfill is on Solonetzic soils. These soils are characterized by high sodium adsorption ratio (SAR), and tend to have low organic matter, poor drainage, and are marginal productivity. BMS was seeking opportunities to diversify their business and better utilize their large land holdings and produce a marketable woody biomass crop that could be used at the City of Edmonton's composter.

In order to improve the utilization of these marginal agricultural lands, SYLVIS proposed the establishment of a coppice-willow plantation with drought and salt-tolerant species in combination with biosolids applications at rates specifically targeted to reduce the soil SAR.

SYLVIS developed a pilot project to test the effects of different biosolids application rates on the physical and chemical properties of soil and on the growth rates of coppice willow, annual crops and forage grasses. As the pilot project fell outside the purview of Alberta sludge guidelines, SYLVIS worked with Alberta Environment and Sustainable Resource Development to obtain the necessary authorizations. Over 9,400 bulk tonnes (2,429 dry tonnes) of dewatered biosolids from the City of Edmonton were land applied by SYLVIS. Biosolids addition resulted in a 50% decrease of soil SAR compared to the control soil, and an increase in yields of grain crops, forage grasses, and willow biomass. A concurrent increase in soil nitrogen and phosphorous content further enhanced the quality of the marginal soil that received biosolids. Responding to stakeholder concerns during the project development phase, SYLVIS monitored nearby water sources and found no negative impacts on adjacent surface water quality.

This pilot project demonstrated the potential of using biosolids as a tool to amend Solonetzic soil conditions in Beaver County, thereby enhancing soil fertility, and improving the yields and quality of crops in the region. It also demonstrated that biosolids applications can support the successful establishment of willows, under adverse climate conditions, and provide opportunities for crop diversification on BMS lands and within Beaver County.

AREAS OF EXPERTISE

- **> Applied Research**
  - Consultation & Education
- **> Operational Management**
  - Options Assessment & Development
  - Policy & Practices

RESIDUALS

- Ash
- **> Biosolids**
- Effluent and Leachate
- Pulp and Paper Residuals
- Unique Residuals
- Water Treatments Residuals

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