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DETECTING CHANNEL RIPARIAN VEGETATION RESPONSE TO BMP IMPLEMENTATION IN WESTERN SOUTH DAKOTA EPHEMERAL STREAMS USING SPOT IMAGERY

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ABSTRACT

Heavily grazed riparian areas are commonly subject to channel incision, a lower water table, and reduced vegetation. Riparian vegetation dissipates flow energy which is critical to maintaining stable channel geometry. Occurrences of prairie cord grass (*Spartina pectinata*) stands were used as evidence of improved riparian health during post best management practice (BMP) assessment within a watershed frequented by ephemeral gullies. Presence/absence of *S. pectinata* was recorded during 2010 assessments of ephemeral channels with drainage areas ranging from .54 to 692 hectares. Reach locations ($n = 115$) were delineated using 2010 National Agriculture Imagery Program (NAIP) imagery resulting in 8-39 sample points per reach subsequently used to extract Normalized Difference Vegetation Index (NDVI) values from a series of Satellite Pour l'Observation de la Terre (SPOT) satellite imagery. Normalized NDVI values from 1,981 sample points were determined from pre (1987, 1994, and 1997) and post-BMP (2010) imagery. Mean normalized NDVI values calculated for each reach ranged from -1.33 to 3.16. ANOVA revealed no mean difference in normalized NDVI among *S. pectinata* classes for pre-BMP years ($P = 0.85, 0.74, 0.82$), respectively. However, in 2010 (post-BMP), *S. pectinata* sites had significantly higher normalized NDVI (1.23) compared to non-*S. pectinata* sites (0.89) ($P = 0.01$). Reappearance of *S. pectinata* due to changes in grazing regimes along with construction of off-stream watering sources was successfully detected remotely. Establishment of *S. pectinata* provides habitat heterogeneity and functions in reducing flow energy which is responsible for the current state of severely incised channels.