The Western Sarpy/Clear Creek (WSCC) project is a Flood Risk Management Project that was constructed under the U.S. Army Corps of Engineers (USACE) Omaha District. Project sponsors included the Papio-Missouri, Lower Platte North and Lower Platte South Natural Resources Districts. Through consultation with the Fish and Wildlife Service (FWS) and the Nebraska Game and Parks Commission (NGPC), it was determined that approximately eight acres of wetlands would be directly impacted from fill during levee construction. Additionally, it was concluded that the project would contribute to the Platte River and decrease the frequency of the river interactions with the floodplain. Reduced flooding outside the river banks would prevent an unquantifiable number of wetlands from forming in the future. Consequently, the Corps was required to mitigate all impacts by constructing 40 acres of wetlands, of which 32 acres were to be wet meadows. The wetlands would be temporarily to seasonally flooded and emulate nearby reference wet meadows within the Platte River Valley.

EXPERIMENTAL DESIGN AND GOALS (CONT.)

Point intercept sampling served as the primary method for quantifying vegetation response. The point intercept method is designed to sample within the total variation and quantity changes in plant species composition and cover over time. Hydrological observations and qualitative vegetation observations are recorded in the field. Vegetation point sampling is conducted in late summer. Permanent photographic stations have been set up to monitor temporal change. Metrics of interest for each cell include: Floristic Quality Assessment Index (FQAI) and Prevalence Index (PI).

FQAI is a modified species richness index based on a species affinity to natural areas. The reference wet meadow FQAI was 11.3 +/- 2.4 standard error (se). The PI is a weighted average indicating sample “wetness” on a scale of 1 to 5. A value of “1” would indicate a community of obligate hydrophytes (OBL), while a value of “5” would indicate an upland plant community (UPL). The reference wet meadow PI was 2.2 +/- 0.6 se. Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS) Version 13.0. Descriptive statistics are provided in the results section for each of the principal metrics. In addition, the means of the PI and FQAI were compared to each treatment to test for significant differences.

RESULTS (CONT.)

There was no significant relationship of the PI and FQAI to treatments. Lack of significance for treatments may be due to the small sample size. Also, no treatments were needed for expression of plant community characteristics or other uncontrollable factors.

EXPERIMENTAL APPROACH TO WET MEADOW DESIGN IN THE LOWER PLATTE RIVER CORRIDOR

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ABSTRACT

An Experimental Approach to Wet Meadow Design in the Lower Platte River Corridor

John Shelman and Mike Gilbert, U.S. Army Corps of Engineers, Omaha District

The project is located within the lower Platte River valley approximately 30 miles west of Omaha, Nebraska. The Platte River forms in western Nebraska at the confluence of the North Platte and South Platte Rivers. The river is approximately 310 miles long and along with its tributaries drains approximately 50,000 square miles of the Great Plains.

In addition to wetland mitigation, numerous conservation measures were also constructed to avoid harm to federally listed birds and fish within the project area. These features consisted of chutes, backwater and emergent sandbar creation. Construction of the river would reduce the amount of shallow water habitat and emerged sandbars.

PLATTE RIVER WET MEADOWS

Platte River wet meadows by definition are granoloid systems with a hyperarid flooded or seasonally flooded water regime. This community occurs in nearly-level floodplains; often in bands surrounding marshy channels. Soils are poorly drained silty and clay loams formed in alluvium. Vegetation under a native setting consists of prairie cordgrasses (Sparganium pectinatum) and sedges (Carex spp.) as dominants. Typically these areas support a high species diversity of hydrophytic and transitional grasses and forbs. These systems occur both as depressions maintained by precipitation and as flow systems within the floodplain mosaics.

EXPERIMENTAL DESIGN AND GOALS

In developing wet meadow design criteria, nearby relatively undisturbed wet meadows were tested and documented in terms of soil profiles, vegetation composition, and soil chemistry. Topsoil borrow sites emulated these characteristics and were composed of similar textural and chemical properties. Top soil depths for the wet meadow creation site were 12”-18”, consistent with the profiles at the reference sites and as documented by a review of local soil survey information. Grading of the site was on an elevation gradient of four feet between 1,064' to 1,067' MSL, at a slope of 1:40.0.

RESULTS

Elevation

The relationship of elevation to PI and FQAI using one-way ANOVA indicated significant relationships for both indices.

A posteriori analyses were conducted using the Tukey-Kramer HSD. Means that were different are presented in the following figures. A distinct trend of the PI and FQAI along the gradient was easily observed. Visual inspection indicated more of a similarity when compared to the reference site between elevations of 1066.0' and 1067.0' MSL. A target elevation of 1065.5' to 1067.0' MSL seemed to be the ecotone between the target Carex spp. and the Spartina pectinata dominated communities.

MONITORING AND DATA ANALYSIS

Invasive species deflecting from the target graminoid system have increased in abundance over time. In developing wet meadow design criteria, nearby relatively undisturbed wet meadows were applied at the recommended rate of one pound per acre and then applied at twice that rate on some cells to determine if seed density affected vegetation response. Hay obtained from a nearby wet meadow was applied as mulch to some of the plots. Some plots received shredded hay to test if mulch density had an affect. Some plots did not receive mulch. Experimental blocks with the various treatments and controls were randomly assigned along the elevation gradient to capture hydrology ranging from inundation to subirrigation. This design was intended to emulate the known hydrodynamics of Platte River wet meadows. The goal was to determine which treatments best respond at what elevation range for target community wetness and native floristic “quality”.

IMPLICATIONS TO RESTORATION PRACTITIONERS

Completing experimental work to advance of implementing a larger project allowed for refinement in target elevations and treatments. The experimental site is in three growing seasons ahead of the 32 acre site. Trends observed in the experimental area may allow for adaptive management of the larger site.

Topsoil depths for the wet meadow creation site were 12”-18”, consistent with the profiles at the reference sites and as documented by a review of local soil survey information. Grading of the site was on an elevation gradient of four feet between 1,064' to 1,067' MSL, at a slope of 1:40.0.

This data can be used to help identify restoration targets, inform restoration strategies, and complete restoration success in the Lower Platte River Corridor.