Platte River Vegetation Mapping Project
2005 Land Cover Methods Summary.

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Introduction:
The Big Bend reach of the central Platte River serves as a major staging area for migratory waterbirds during spring migration. A baseline inventory of the current vegetation along the central Platte River was created in a Geographical Information System (GIS) to map communities. This baseline vegetation dataset can be used in a multitude of analyses and habitat models to better plan and implement conservation practices.

Methods:
Data gathering and mask creation. Our base dataset was the Farm Service Agency's Common Land Unit (CLU), an agriculture field boundary layer. All 17 counties needed for the landcover dataset were merged into a seamless layer. Next, the data were assigned a basic class, which included agriculture fields, undisturbed grassland, trees, grass, water, non-agriculture, and developed. These classes were created by heads up digitizing at a 1:5,000 scale, referencing 2004 color as well as 2004 and 2005 color-infrared imagery.

Vegetation classification system. Vegetation was classified using the National Vegetation Classification System (NVCS) in order to be consistent with all federal agencies. We mapped to the alliance/association level, which characterizes vegetation by the dominant species in the community and included vegetation classes, bare soil classes, agricultural classes, water feature classes, and development classes.

Imagery acquisition/processing. Imagery was collected to 5 mi either side of the channel from 15 August through 5 September, 2004 and 25 August through 1 September, 2005. Images were color-balanced and orthorectified. Imagery from 2005 was used when available.

Sampling and database design. To develop the sampling framework, eCognition (Trimble Germany GmbH, Munich, Germany) was used to complete a multi-resolution image object segmentation. This process created image objects containing similar spectral and textural characteristics. Polygons were chosen from those created by eCognition to be used as sample training data.

Field work. Technicians used Trimble GPS units to navigate to sample polygons and enter vegetation data in the field. When the technician arrived at a sample polygon, the overall vegetation community type was assessed and up to three dominant plant species were attributed, along with their approximate relative coverage in the polygon. Over the course of two summers, nearly all public and non-governmental organization lands along the river from Lexington to Highway 281 at Grand Island were visited.

Image classification. After field data were uploaded into the database, sample polygons provided data used to "train" eCognition with a known vegetation community's spectral signature. This information was then extrapolated by eCognition via a nearest neighbor classification strategy across the entire image. The result was the fully classified landcover for the image. A field technician then conducted a complete photo-interpretation process to reclassify obvious misclassifications. As an additional step, features were separated into finer mapping units that could not be remotely sensed using eCognition. For example, water was separated into sand pits, stock dams, canals, etc. Ancillary data were employed to separate similar habitat types based on their position on the landscape. For example, digital elevation model (DEM) data were used to delineate the Platte River valley from the surrounding uplands. This delineation was used to separate wet meadow grasslands from upland mixed-grass prairie and riparian shrublands from upland shrublands. When the remotely sensed landcover was completed, the training data polygons were reintegrated into the landcover.

Accuracy assessment. The accuracy assessment process was conducted after final photo-interpretation and before the use of landscape features to separate habitat types and the training data were reintegrated. The assessment was completed by selecting 30 features of each vegetation class from the set of collected field data. These features were intersected with the nearest neighbor classification and the total acres were summarized. The result was an error matrix that displayed errors of omission and commission, as well as overall accuracy. As a whole, the landcover has an accuracy of 98.9%. Because this error matrix is created using acres of samples, it is heavily weighted by the large area of the agriculture class compared to any other class in the study area. The overall accuracy of the landcover considered without agriculture, developed, and water is 82.7%.

Final Landcover:
The final landcover dataset is available in hard-copy, digital raster, and digital vector formats (Figure 1).

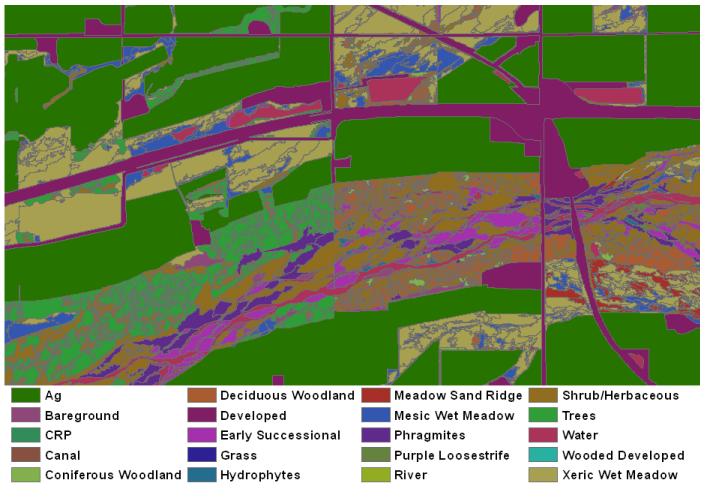

Figure 1. Platte River landcover in a portion of Buffalo County, NE.

Great Plains GP² GIS Partnership