

Conservation Geography

Case Studies in GIS, Computer Mapping, and Activism

Edited by Charles L. Convis, Jr.

ESRI Press

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Platte River Whooping Crane Maintenance Trust

Robert J. Henszey, Wetland ecologist



Bob Henszey, Wetland ecologist for the trust, samples wetland plants to study relationships between plant species and hydrology.

The Platte River Whooping Crane Maintenance Trust (www.whoopingcrane.org) is a private nonprofit organization dedicated to the conservation of migratory bird habitat along Nebraska's Platte River. Our mission is to protect and maintain the physical, hydrological, and biological integrity of the Big Bend area of the Platte River in south-central Nebraska, so that it continues to function as a life support system for whooping cranes and other migratory bird species.

The central Platte River valley has hemispherical significance as a staging area for migratory water birds and offers critical habitat for a variety of migratory and nonmigratory birds. The region is best known for the 500,000 sandhill cranes and five million to seven million ducks and geese that migrate annually through the

valley, but twenty-two endangered, threatened, or candidate plant and animal species are also found here. These species are largely dependent on the river and adjacent riparian habitat to meet their needs. During the past one-hundred years, however, the central Platte River valley has undergone a substantial transformation. Water development projects reduced a once wide and treeless river (up to one mile wide) to a number of narrow channels with extensive woody vegetation. Since 1865, channel widths in many areas have narrowed by 70 percent or more. In addition, agricultural policy and practice have led to extensive monocropping, habitat fragmentation, and loss of wetlands. Native grasslands, wetlands, and wet meadows, which provide important feeding and nesting habitat for migratory birds and other species, now exist primarily as remnants within a matrix of agricultural land.

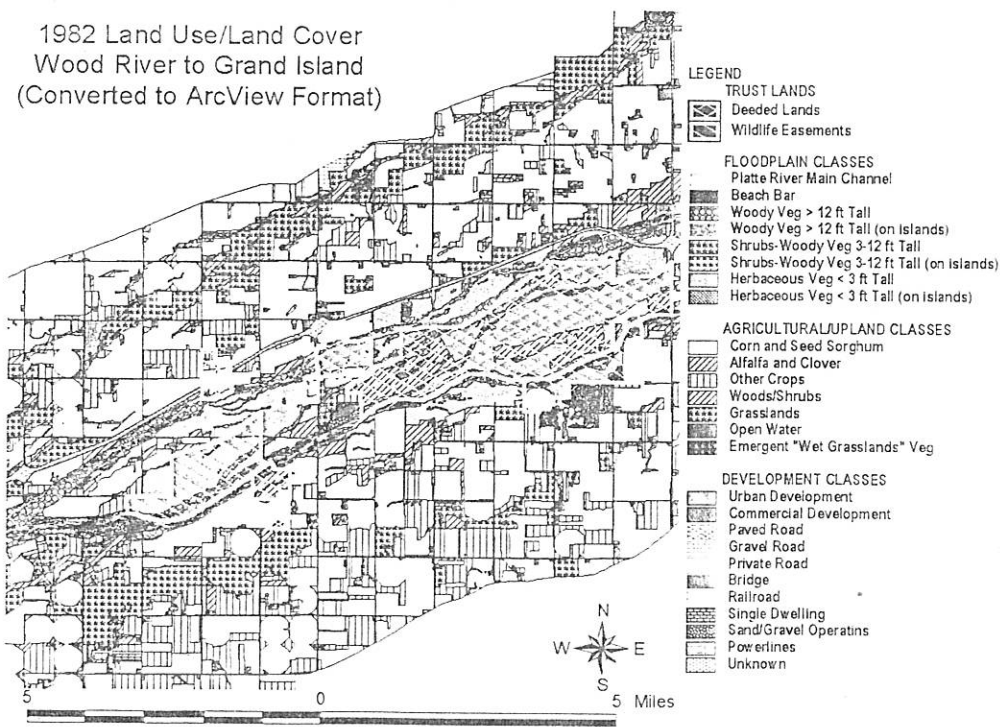
To maintain and enhance this important migratory bird habitat, the trust acquires land and water rights; manages, protects, and restores habitat; and conducts research related to migratory birds and their habitat needs. Where compatible with the trust's mission, existing agricultural and other traditional land uses are used and promoted by the trust. The trust currently owns and manages about 10,000 acres of habitat along seventy miles of the Platte River. Most of this land is in native pasture, hayland, or other riparian

habitats, with about 1,700 acres in row crop agriculture. The trust also has cooperative habitat protection programs with the National Audubon Society, The Nature Conservancy, and the U.S. Fish and Wildlife Service.

In 1982, the trust pioneered a GIS for the Platte River with its MOSS inventory of land use and land cover within three and a half miles of the river, but this system was cumbersome and is now obsolete. With a grant from ECP-CGISC, the trust purchased ArcView GIS and began utilizing the current features available for GIS. Examples from some of our recent projects follow.

Wet Meadow Restorations

The trust has an active program of converting marginal cropland back to wet meadows. Since 1981, the trust has restored 1,195 acres to mesic grasslands and wet meadows. Early restorations incorporated low-diversity seed mixtures on leveled crop fields. More recent restorations include locally collected high-diversity seed mixtures on partially recontoured land surfaces. Since recontouring is expensive, GIS has helped us to develop the best design for our budget while incorporating information such as soils and previous topography. Until detailed digital soil maps become available for our area, we have been using digital orthophotoquads as a basemap to indicate soil boundaries. Digital line graphs (DLGs) from USGS 1:24,000 topographic maps are also used



Craig Davis, avian ecologist for the trust, bands a female northern oriole to study species movements and site fidelity.



Nature Center restoration after recontouring. Photo courtesy Nebraska Game and Parks Commission.

with ArcView GIS to suggest topography and drainage patterns for sites where the topographic map was compiled before conversion to cropland. The total area to be restored for each habitat type, computed with ArcView GIS, has been very useful in determining the amount of seed we need to collect by hand for each species and how much dirt work will be required. In the past, we marked the location to excavate topographic patterns on the ground "by eye," but we hope to improve upon our placements in the future with a recently purchased GPS.

Crane Roost Maintenance and Enhancement

At the peak of the spring migration in mid-March, up to 40,000 sandhill cranes per river mile return to the safety of the Platte to roost for the night after feeding in the surrounding cornfields and wet meadows during the day. The only remaining migratory flock of endangered whooping cranes also migrates through our area, and each year several birds stop to roost and feed along the river. Both crane species prefer a wide (>750 ft. for sandhill and >1,000 ft. for whooping cranes), shallow, unobstructed river to roost. Over the past hundred years, however, cottonwood and willow encroachment has narrowed the river, forcing cranes to roost in the few remaining suitably wide reaches of the Platte River.

Since 1982, the trust has been actively clearing selected areas on more than 20 miles of river channel to maintain and enhance crane roosting habitat. A combination of shredding and disking with heavy equipment is used to remove the vegetation. The focus of these efforts has been on river islands, but banks have also been cleared to achieve a minimum unobstructed channel width. If clearing is followed by high flows, some of the smaller islands and sandbars erode, creating wider channels. However, periodic maintenance is necessary on most sites every two to five years to maintain an unobstructed channel width.

For clearing on private lands, the trust must prepare a plan for the landowner and the U.S. Fish and Wildlife Service. Before using ArcView GIS, preparing these plans was difficult and time-consuming. We now use ArcView GIS

with a recent georeferenced aerial photograph, converted from MrSID™ to TIFF format, as a basemap. Section lines are overlaid on this basemap, and the area of potential riparian forest and willow/sandbar communities to be cleared is calculated. Photo points for long-term monitoring are also labeled on these maps.

Additional ArcView GIS Projects

Besides the projects highlighted above, the trust is using ArcView GIS for several other projects. We use ArcView GIS to monitor the spatial distribution and status of trust lands (e.g., facilities, rangelands, croplands, restorations, prescribed burns, and study areas) and to help with management planning, habitat assessments, and scientific studies of migratory birds and their habitat. With our new GPS, we plan to monitor the location and status of individual plants from a small population of the threatened western prairie fringed orchid (*Platanthera praecleara*), which occurs in one of our pastures. Whenever we install an observation well for studying wet meadow water table patterns, we use a map produced with ArcView GIS to register the well with the state of Nebraska. Finally, we use ArcView GIS to view and use spatial data from other organizations, such as the U.S. Fish and Wildlife Service's wetland inventory, and the spatial databases produced by the Platte River Endangered Species Partnership (www.usbr.gov/platte/).

Future ArcView GIS Projects

As a major participant in the Platte River Endangered Species Partnership, the trust will most likely use ArcView GIS in the future to accomplish the following:

- 1 Monitor spatial and temporal changes in Platte River channel habitat and determine how these changes may affect habitat use by endangered whooping cranes, least terns, and piping plovers and by other nonlisted bird species (e.g., sandhill cranes, waterfowl, and shorebirds).
- 2 Monitor spatial and temporal changes in Platte River grassland and woodland



communities, agricultural land uses, and rural and urban development, with special emphasis on how these changes may affect grassland and woodland birds.

- 3 Identify priority areas for channel, wet meadow, and woodland community protection, habitat enhancement, and restoration.
- 4 Inventory the annual status of Platte River channel management areas (e.g., clearing woody vegetation to enhance crane and waterfowl roost habitat and nesting habitat for terns and plovers).

Data and analyses from these efforts will help the trust educate decision makers, conservationists, natural resource professionals, and landowners about protecting and enhancing the Platte River ecosystem. In the past, these efforts were hampered by a lack of quality spatial data and computer-based analytical tools. With ArcView GIS, we have an invaluable tool to promote the wise use and management of the Platte River.



Protected Habitat - Central Platte River East Half

