Cottonwood Forest Regeneration on the Expanding White River Delta along the Missouri River in South Dakota

W. Carter Johnson and Malia Volke
Department of Natural Resource Management, South Dakota State University, Brookings, SD
Contact: malia.volke@sdstate.edu

I. INTRODUCTION

- Cottonwood forests have significantly declined along the Missouri River due to dam construction and other human disturbances (Johnson 1999).
- Remaining cottonwoods have been described as the "living dead" because dams and altered water flows prevent cottonwood regeneration along much of the Missouri River.
- Novel (unnatural) river habitats, including delta formations where tributaries empty into reservoirs, are one of the few places along the Missouri River where there is evidence of cottonwood regeneration (Johnson 2002).
- The White River delta in South Dakota, formed at the confluence of the White River and Fort Randall Reservoir, represents a novel habitat that supports cottonwood establishment.

Objectives:
1) Identify the availability and condition of potential study sites along the White River delta and select future sampling locations.
2) Establish contact with local landowners and gain permission to access study sites.
3) Test vegetation sampling methods and acquire preliminary data.

II. STUDY SITE: THE LOWER WHITE RIVER & DELTA

White River Watershed
Size: 25,650 km² ; Elevation: 402 – 1485 meters ; Average annual precipitation: 44.2 cm ; Average annual temperature: 8.8 °C (Benke and Cushing 2005)

Fig. 1. The White River delta near Oacoma, South Dakota.
Fig. 2. Aerial photograph of the White River delta with completed and potential cottonwood forest stands.
Fig. 3. Photo looking downstream (~SE) on the flooded White River delta, June 2011.

III. METHODS

- In selected cottonwood forest stands, overstory trees, shrubs, saplings, and seedlings were identified to species and measured for age and size characteristics.
- Overstory trees >10 cm diameter at breast height (dbh) were sampled using the quarter method (Cottam and Curtis 1956).
- Shrubs and saplings >1 m tall and <10 cm dbh were sampled using the line-strip method (Lindsey 1955).
- Woody plant seedlings <1 m tall were sampled using the quadrant method.
- Standard vegetative variables such as density, dominance, basal area, and frequency were calculated for each stand and variables were compared between stands.

IV. RESULTS

- A heterogeneous mixture of cottonwood forests exists within the White River delta.
- Cottonwood forests on the White River delta exhibit both similarities and differences in composition and structure from those along natural river reaches.
- Differences between delta and natural forests appear to be due to altered sediment and flow regimes related to water level regulation on Fort Randall Reservoir.
- Continued research will lead to an improved understanding of the contribution of tributary deltas to cottonwood recovery on the Missouri River.

V. CONCLUDING REMARKS

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- Differences between delta and natural forests appear to be due to altered sediment and flow regimes related to water level regulation on Fort Randall Reservoir.
- Continued research will lead to an improved understanding of the contribution of tributary deltas to cottonwood recovery on the Missouri River.

VI. LITERATURE CITED


VII. ACKNOWLEDGMENTS

This work was funded by the South Dakota State University Research and Scholarship Support Fund.