

Bird Community Differentiation in Restoration of Bottomland Hardwood Forests

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Forest community restoration in the primarily agricultural landscape of the Mississippi Alluvial Valley (MAV), USA, has been initiated for several societal purposes. These purposes include recreational, economic, and biological objectives, among others. One biological objective has been to provide habitat for migratory birds of late successional stands. Because row-crop agriculture occupies the vast majority of the current MAV landscape, returning portions of this landscape to late successional forest will require a long time. Thus, a process of directed landscape change as well as purposefully managed forest succession will occur over the next 80 or more years. This change has begun with the addition of large amounts (10^5 ha) of early successional vegetation to the landscape. Little opportunity for study of early successional development of forest stands in the MAV has existed until recent years. An unprecedented opportunity exists to investigate the response of wildlife to this landscape. Such study will prepare a baseline of information on avian occurrence in the successional interim before the achievement of late successional stands with their attendant birds takes place. A long-term demonstration study of succession under several afforestation treatments on the Sharkey Large-scale Restoration Experiment, Sharkey Co., MS, USA, was established at the beginning of the 1995 growing season (Schweitzer et al. 1997). This experiment consists of a complete randomized block design with three replicates of four separate forest restoration treatments in 8 ha plots: natural regeneration (NAT), sown *Quercus nuttallii* acorns (SOW), planted *Q. nuttallii* seedlings (PLN), and planted *Populus deltoides* with underplanted *Q. nuttallii* seedlings (NUR). One aspect of the study involves winter bird communities sampled using techniques of the Winter Bird Population Study (Kolb 1965). Abundance and distribution among treatments are compared for a total of 43 bird species observed in winter 1999-2000. Simulation analyses of bird species richness values are further generated from null models of species occurrence generated from data for three winter seasons, 1998-2000. After six growing seasons, bird community composition among the NAT, PLN, and SOW treatments continues to be similar, represented by a suite of species that are old-field and mixed shrub-grassland inhabitants. Bird communities in stands of fast growing trees (NUR) contain twice as many species as those in these other treatments involving slower growing trees, however. The differences represent the addition of generalist forest canopy dwelling species to that suite of avian species of early successional habitats. These results are robust with respect to sampling and analytical method. Among 14 species frequent

enough for individual analysis, those commonly associated with forest are identifiable in the fastest growing stands, while those associated with early successional shrub vegetation are widely distributed among the treatments. Species of earliest successional grasslands are less numerous than in earlier years of the study. These results confirm those observed in earlier work on the Sharkey Site (Hamel et al. in press). They indicate that the composition of the winter bird community is beginning to differentiate between the separate treatments. At the same time, effects of variation in weather are apparent among years, and effects of features of the surrounding landscape are apparent in the variations in structure of the replicate treatment plots. A projected future development of these bird communities follows reasonably accepted principles whereby vegetation structure is considered a primary determinant of bird species occurrence and bird community composition. Continued work on the Sharkey Site will permit monitoring and evaluating the succession of the bird community.

Hamel, P. B., D. J. Twedt, T. J. Nuttle, C. A. Woodson, F. Broerman, and J. M. Wahome. (In press):

Forest restoration as ecological succession: should we speed it up or slow it down? Pages xx-xx in M.M. Holland, M.L. Warren, Jr., and J. A. Stanturf, editors. Proceedings of a conference on Sustainability of Wetlands and Water Resources. Oxford, Mississippi, 21-23 May 2000. USDA Forest Service, Southern Research Station, Asheville, NC. General Technical Report SRS-xx.

Kolb, H. (1965):

The Audubon Winter Bird-Population Study. *American Birds* 19:432-434.

Schweitzer, C.J.; Stanturf, J.A.; Shepard, J.P.; Wilkins, T.M.; Portwood, C.J.; Dorris, L.C., Jr. (1997):

Large-scale comparison of reforestation techniques commonly used in the Lower Mississippi Alluvial Valley: first year results. In: Pallardy, S.G.; Cecich, R.A.; Garrett, H.; Johnson, P.S., eds. Proceedings of the 11th Central Hardwood forest conference; 1997 March 23-26; Columbia, MO. Gen. Tech. Rep. NC-188. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 313-320.