

*Oral; Contributed Paper; Travel Scholarship; Presentation Award*

## **Plant and Duck Community Responses to Management and Hydrology on Wetlands Reserve Program Lands in Mississippi.**

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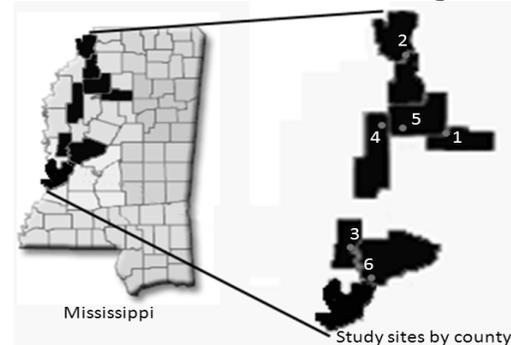
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*Extended Abstract:* Wetlands Reserve Program (WRP) lands in the Mississippi Alluvial Valley (MAV) often contain seasonally flooded moist-soil wetlands and associated plant communities managed for avian and other wildlife species. Seasonally flooded and managed moist-soil wetlands on WRP lands produce plant communities frequently providing abundant food and other habitat resources for migrating and wintering waterfowl. Improving and expanding moist-soil management may enhance overall habitat suitability of WRP lands for waterfowl and other wetland wildlife. However, few monitoring techniques exist to evaluate wetland conservation programs in North America. Evaluating plant and avian responses to management of moist-soil wetlands on WRP lands may provide insight into effectiveness of conservation and restoration programs.

Providing quality habitat for migrating and wintering waterfowl and other waterbirds is a goal of WRP. We adapted a Floristic Quality Assessment Index (Taft et al. 1997) into a Vegetative Forage Quality Index (VFQI) to evaluate moist-soil plant species for their potential in providing waterfowl forage based on their metabolizable energy value. We also evaluate winter use of wetlands by waterfowl. We studied

on 18 private WRP lands with differentially managed wetland sites in Mississippi's MAV during 2007-2009 ( $n = 54$ ; Fig. 1). We used a block design to evaluate avian and plant-community responses to experimental treatments of active and reduced wetland management.



**Figure 1:** Primary study sites (dots) within counties of Mississippi's Mississippi Alluvial Valley during 2007-2009: 1) Grenada, 2) Quitman/Tunica, 3) Sharkey, 4) Sunflower, 5) Tallahatchie, and 6) Warren/Yazoo counties.

We defined active management as a combination of monthly inspections of wetlands by landowners or managers, annual soil disking, and management of undesirable plants by herbicide or other treatments. We defined reduced managed sites as those with infrequent soil disturbance ( $> 3$  years), no seasonal control of undesirable plants, and

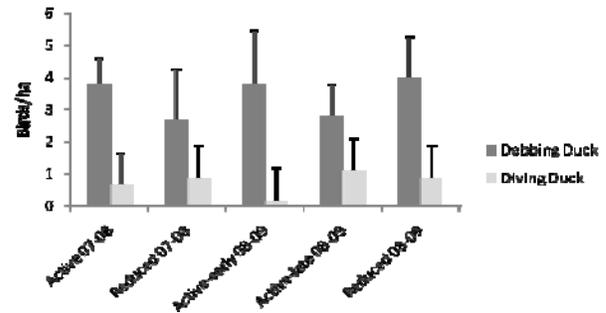
minimal hydrological management. We further classified drawdown methods for wetlands as (1) active with early drawdown (active-early), (2) active with late drawdown (active-late; drawdown dates  $\geq 3$  weeks following active-early drawdown), and (3) natural evaporation (reduced) on WRP wetlands.

We conducted flush count surveys of waterfowl and reported least-square means of duck abundance by wetland area, calculated from each predicted model value, for winters 2007-2008 and 2008-2009. We used systematic surveys to evaluate vegetative communities, for June-October 2008-2009. Finally, we developed a VFQI to assess quality of the vegetative community as waterfowl forage, based on ratings of seeds or tubers of plant species by 15 'expert' wetland and waterfowl scientists and managers.

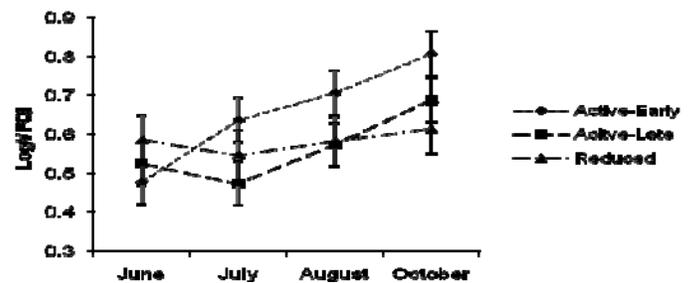
Our surveys began in winter 2007; thus, we were unable to determine spring and summer 2007 management regimes, prior to fall flooding. Therefore, we classified sites in winter 2007-2008 as either active or reduced management.

Results from winter 2007-2008 and 2008-2009 surveys indicated no treatment effect on variation in dabbling and diving duck abundance ( $P \geq 0.15$ ). However, dabbling and diving duck abundances were influenced by wetland size in winters 2007-2008 and 2008-2009 ( $P < 0.01$ ). We also examined potential differences in duck abundance by survey date. Dabbling and diving duck abundances were greatest in February 2007-2008 and 2008-2009 ( $P \leq 0.09$ ), with the exception of diving duck abundance which did not differ, among surveys in winter 2008-2009 ( $P = 0.19$ ).

Our VFQI differed among sampling months for active-early ( $P \leq 0.01$ ), active-late ( $P \leq 0.01$ ), but not reduced managed sites ( $P = 0.80$ ). No difference in VFQI was detected among June, July, and August 2008 ( $P \geq 0.10$ ). However, VFQI differed between active-early and reduced managed sites in October 2008 ( $P = 0.03$ ). The October VFQI for active-early managed sites was 56 % greater than reduced managed sites, but no difference was detected between active-early and active-late and active-late and reduced managed sites ( $P \geq 0.40$ ; Fig. 3).



**Figure 2.** Least-squared mean of seasonal abundance by wetland area ( $n$  birds/ha; SE) of dabbling (*Anas* spp.) and diving ducks (*Aythya* spp.) on moist-soil wetlands ( $n = 54$ ) on Mississippi Wetlands Reserve Program lands, December-March, 2007-2009. See text for definition of treatments.



**Figure 3.** Mean monthly Vegetative Forage Quality Indices ( $\pm$  SE) by treatment in moist-soil wetlands ( $n = 54$ ) on Mississippi Wetland Reserve Program lands, summer 2008. See text for definition of treatment.

Results from our VFQI indicate that vegetation had greater potential foraging quality on active than reduced managed sites (Fig. 3). Therefore, regarding the goals of WRP to provide habitat for waterfowl, our results contribute to an increasing body of evidence suggesting active management promotes quality waterfowl foraging habitat in moist-soil wetlands. Our results also suggest duck abundance varies positively with wetland area. Therefore, we recommend WRP managers manage their moist-soil wetlands actively and ensure complete wetland flooding during winter. Similarly, we encourage researchers to continue to evaluate the relationships between waterfowl and other waterbird abundance and wetland size.

Taft, J. B., G. S. Wilhelm, D. M. Ladd and L. A. Masters. 1997. Floristic quality assessment For vegetation in Illinois, a method for assessing vegetation integrity. *Erigenia* 15:3-95.