

*Poster; Travel Scholarship; Presentation Award*

**Evaluation of Wetland Size and Vegetative Quality on Waterfowl Use in Wetlands Reserve Program Wetlands in Mississippi.**

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*Extended Abstract:* Seasonally flooded and managed moist-soil areas on Wetlands Reserve Program (WRP) lands produce plant communities with abundant food and habitat for migrating and wintering waterfowl. Further, dabbling ducks and other waterfowl may concentrate on wetlands with abundant natural foods (Fredrickson and Taylor 1988). Kross et al. (2008) found that moist-soil plants on managed wetlands in the Mississippi Alluvial Valley (MAV), provide on average 555 kg/ha (dry mass) of seed and tubers. Metabolizable energy from moist-soil plant seeds and tubers for waterfowl can approximate available energy from agricultural seeds. Conservation programs provide guidelines for maintenance of early successional, annual plant communities which provide valuable food and cover for wetland wildlife.

Improving moist-soil management may enhance overall habitat suitability of conservation lands for waterfowl and other wetland wildlife. Evaluating plant-community and wildlife responses to management of early successional moist-soil habitat on WRP lands provides insight into effectiveness of conservation and restoration programs. To date, few monitoring techniques exist to evaluate wetland conservation programs in North America.

Waterfowl biologists and wetland managers in North America need simple, yet ecologically meaningful, assessment techniques for moist-soil plant communities. Assessments of conservation efforts can be measured by examining vegetative community quality.

Because an important goal of WRP is to provide quality habitat for migrating and wintering waterfowl, we quantified the vegetative community in 54 moist-soil wetlands located on private lands enrolled in WRP in Mississippi. We used systematic surveys to calculate monthly plant species or genera frequency of occurrence during June-October 2008. We also calculated mean relative abundance of each plant species (or genus) within moist-soil wetland from frequency of occurrence estimates.

Floristic Quality Assessment Indices (FQAI) are used to assess the conservation value of natural plant communities, monitor restoration success, and evaluate the ecological condition of sites (Taft et al. 1997). We adapted a FQAI to develop a Vegetative Forage Quality Index (VFQI) to evaluate moist-soil plant communities for their potential to provide waterfowl forage (i.e., seeds and tubers) based on the metabolizable energy value of moist-soil plants as waterfowl food. For

each moist-soil wetland, we calculated a VFQI using the formula below (Taft et al. 1997), wherein C is a weighted forage quality coefficient representing the average relative nutritional value of the plant species for waterfowl (rated by 15 experts with doctorates and  $\geq 5$  years experience in moist-soil wetlands and waterfowl ecology and management, FO is frequency of occurrence of each plant species (or genus) detected during vegetation surveys, and  $N$  is species (or genus) richness.

$$\text{VFQI} = \frac{\sum (C [FO]) \times \sqrt{N}}{N}$$

We conducted 5 surveys of moist-soil wetlands between December 2008 – March 2009 to estimate simultaneously waterfowl abundance and wetland area (ha). Subsequently, we regressed (PROC MIXED) variation in waterfowl abundance on VFQI, survey period (PERIOD), and wetland size (SIZE). We detected a positive relationship between VFQI and wetland size ( $P < 0.01$ ). Thus, we did not include VFQI and wetland size together in models but used  $\Delta\text{AIC}$  and AIC weights ( $w_i$ ) to assess the relative support of VFQI+PERIOD, VFQI\*PERIOD, SIZE+PERIOD, and SIZE\*PERIOD models.

We found overwhelming support for the model containing SIZE+PERIOD ( $w_i=1.00$ ), indicating that waterfowl abundance varied with wetland size when controlling for survey period.

Result from our summer 2008 VFQI surveys indicated that active management can increase VFQI on our moist-soil wetlands by 50% over areas with little to no management ( $P = 0.03$ ). However, we did not find a relationship of winter waterfowl abundance with VFQI. If food quality, as measured in our study by October VFQI, influences waterfowl use of moist-soil wetlands in the Mississippi MAV, we did not detect such a relationship at the scale of individual moist-soil units.

We cannot explain the lack of a relationship between waterfowl abundance and VFQI. Perhaps winter forage quality and waterfowl use on moist-

soil wetlands may be influenced by other factors not measured in our study (e.g., weather, disturbance).

To address the goal of the WRP of providing habitat for migratory and wintering waterfowl and other wetland obligate wildlife, we recommend landowners actively manage moist-soil wetlands to maintain early successional plant communities and ensure maximum basin flooding during winter as waterfowl use correlated with wetland area.

## Literature Cited

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