A. Title Page

Professional Development Grant Report
Arkansas Tech University

Participation in the International Meeting of the Society of Wetland Scientists

by

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Assistant Professor of Wildlife Biology
Department of Biological Sciences

6 June 2008

B. Restatement of problem researched or creativity

I recently gave a talk entitled "Moist Soil Seed Abundance on Wetland Reserve Program Sites in the Mississippi Alluvial Valley of Arkansas" at the 2008 Annual Meeting of the Society of Wetland Scientists. This conference was held May 26-30, 2008 in Washington, D.C. Since travel funds were not provided by the conference, I applied for and received funds from Arkansas Tech University's Professional Development Grant Committee. Below is the abstract of the research I presented at the conference.

Abstract The Mississippi Alluvial Valley (MAV) provides important habitat for migrant and wintering waterfowl in North America. Since human settlement, over 70% of the original MAV habitat for waterfowl has been destroyed or altered. Wetland managers are now using moist-soil management to increase waterfowl foraging habitat in the MAV. Several studies have examined moist-soil seed abundance on managed public wetlands and the resulting contribution of energy availability for waterfowl foraging habitat. However, little is known about moist-soil seed abundance on private wetlands enrolled in the Wetland Reserve Program (WRP). To estimate moist-soil seed abundance on private WRP lands in Arkansas, I conducted a stratified survey on WRP sites in Arkansas during autumns 2006 and 2007. I collected 10 soil core samples in each of 19 WRP sites in five counties in the MAV of Arkansas. Mean moist-soil seed mass on WRP wetlands was 476.65 kg/ha (dry mass; SE=31.82), which was 20.3 kg/ha less than mean seed abundance on managed public wetlands throughout the MAV in autumns 2002-2004 (Kross 2006:50). Time since entry into the WRP program had a positive effect on seed abundance ($R^2 = 0.31$, $P < 0.05$) There are approximately 77,000 ha currently enrolled in the WRP program in Arkansas, approximately 20% of which are moist-soil habitat. Based on my estimate of moist-soil seed abundance, these moist-soil WRP sites may provide over 55 million duck-use days for wintering waterfowl in Arkansas.

C. and D. Brief Review of the Research Procedures and Summary:

Participating in this conference allowed me to attend numerous talks and gain important knowledge about current wetland research which I plan to incorporate into the Wetland Ecology class I teach. My presentation was well received by conference attendees and several other researchers expressed interest in future collaboration. As part of this report I have included a

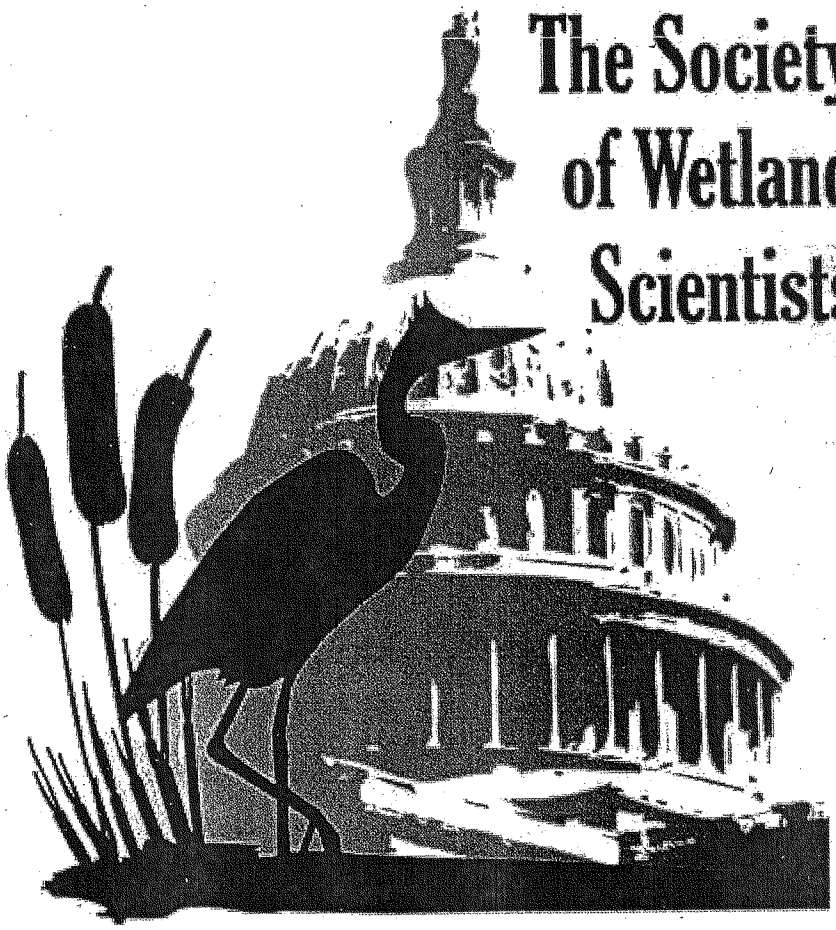
copy of the schedule showing my talk listed and a copy of the talk I gave at the conference (Attachment 1).

While at the conference, I was also able to participate in the Executive Board meeting of the South-Central Chapter of SWS. I have recently been elected to the Executive Board which deals with Chapter business for the 8 states included in the South-Central Chapter. We voted on several orders of Chapter business and made plans for the annual Chapter meeting to be held this fall in Tuscaloosa, AL.

E. Conclusions and recommendations

In conclusion, the conference was extremely beneficial in fostering scientific exchanges between diverse groups of professionals involved in wetland stewardship around the world. To be included in the conference was an honor and I feel that Arkansas Tech was well represented and gained recognition among professional wetland scientists.

The Society of Wetland Scientists



Capitalizing on Wetlands International Conference

2008

WASHINGTON D.C.
MAY 26-30

29th Annual Meeting Conference Program

Hosted by the Mid-Atlantic Chapter of SWS

Thursday Afternoon, 27 May 2008

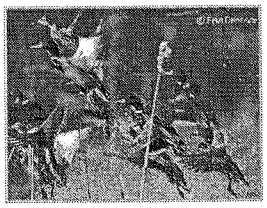
Time	CONTRIBUTED PAPER SESSION #11 – BIOGEOCHEMISTRY AND WETLAND PLANTS – *Ballroom West* *Sponsored by the Biogeochemistry Section of SWS* Moderator: Adam Langley	CONTRIBUTED PAPER SESSION #12 – PEATLANDS – *Hoover Room* Moderator: Zicheng Yu	CONTRIBUTED PAPER SESSION #13 – WETLAND ASSESSMENT I – *Coolidge Room* Moderator: Candy Bartoldus	CONTRIBUTED PAPER SESSION #14 – CLIMATE CHANGE – *McKinley Room* Moderator: David White
1:30-1:45		***C.J. Murphy** and L. Hahn;* Preliminary vegetation classification for west-central Idaho peatlands	***C.C. Bartoldus**, L.L. Orzetti, J. Yi, E. Somerville, R. Tiner, E. Stein, and P. Adamus;* Ecological Assessment Methods Database	***G.A. Hood** and S.E. Bayley;* Beaver (*Castor canadensis*) mitigate the effects of climate on the are of open water in boreal wetlands of western Canada
1:45-2:00		***D.L. Watts**, M.J. Cohen, T.Z. Osborne and M.W. Clark;* Nutrient and calcium gradients at the ridge-slough interface of the central Everglades	***C.A. Johnston**, B.L. Bedford, M. Bourdaghs, C. Frieswyk, M. Tulbure, L. Vaccaro and J.B. Zedler;* Classifying Great Lakes coastal wetland plant communities by multivariate statistical methods	***S.E. Bayley**, A.S. Wong and J. Thompson;* Drought vs. agriculture: Effects on water quality and productivity in northern shallow water wetlands
2:00-2:15	***B.W. Benscoter;*** Linking community composition to carbon storage in boreal bogs: Dominant-driven function in a species limited ecosystem	***M.T. Distler** and D.J. Leopold;* Recent *Typha* (cattail) encroachment and dominance in long-term stable Lake Ontario fen communities	***W.V. Veselka**, J.T. Anderson and W.S. Kordek;* Getting the most from wetland indices of biological diversity	***D.A. White;*** Patterns in plant biomass production and likely causes over 24 years of study within the wetlands of the Mississippi River Delta
2:15-2:30	***C.P.J. Mitchell**, C.C. Gilmour, J.T. Bell and G.S. Reidel;* Biogeochemical controls on methylmercury production across three vegetation zones in a Chesapeake Bay brackish marsh	***K.B. Smith**, S.F. Forest, C.E. Smith and A.J. Richard;* Linking ecological processes and patterns at different spatial scales to remote sensing-based techniques to map peatland wetlands using satellite imagery	***M.P.W. Weinstein;*** Getting past fundamentals: Evaluating restoration success in the framework of essential fish habitat	***B. Middleton;*** Latitudinal trends in soil organic matter and climate change in baldcypress swamps in North America
2:30-2:45	***L.T. Kissoon**, D.L. Jacob and M.L. Otte;* The distribution of metals in the rhizosphere of wetland plants in flooded and non-flooded soil	***A.D. Cohen**, P.E. Marsh and E.M. Stack;* Effects of the fires of 2007 on peat deposits of the Okefenokee Swamp: Preliminary results based on pre-fire and post-fire comparisons of peat thickness, micropetrography, and chemistry	***C.L.M. Hargiss**, E.S. DeKeyser, D.R. Kirby and M.J. Ell;* Wetland assessment using the North Dakota Rapid Assessment Model and the index of plant community integrity	***J.O. Bosire;*** Resilience of mangroves to climate change
2:45-3:00	***K.F. Crowley**, A.W. Cheesman and B.L. Bedford;* Mosses influence microbial activity and phosphorus availability in shallow fen soils	***M.J. Burke-Scoll**, R.K. Wieder, M.A. Vile, K.D. Scott, N.B Weston and D.H. Vitt;* Biological N_2-fixation in an Alberta, Canada bog	***A.J. Jacobs**, E.M. McLaughlin, A.H. Howard and A.B. Banning;* Development of a rapid assessment for tidal wetlands in the mid-Atlantic, USA	***B.J. Huberty;*** The big-picture climate change and wetlands: How to map it
3:00-3:30	**Break – Exhibit Hall C**			
3:30-3:45	***J.A. Langley**, D.R. Cahoon and J.P. Megonigal* Global change and the plant-mediated controls on coastal marsh viability	***B.W. Benscoter**, D.K. Thompson, M.R. Turetsky, J.M. Waddington, M.D. Flannigan, B.M. Wotton and W.J. deGroot;* Plant functional type-mediated controls on ground layer combustion in boreal bogs	***S.J. Miller** and D.H. Wardrop;* IBIs and wetland quality standards: Using empirical data to define tiered aquatic life uses in pennsylvania wetlands	***B. Gopal;*** Climate change impacts on wetlands across the altitudinal gradient in the Himalaya
3:45-4:00	***K.B. Boomer** and B.L. Bedford* Linking groundwater-induced redox gradients with patterns of plant species diversity in New York fens	***Z. Yu**, S.S. Cai and R.K. Booth;* Effects of Holocene climate and hydrology on carbon accumulation in peatlands on the Kenai Peninsula, Alaska	***C.R. Lane**, K.C. Reiss, S. Decelles and M.T. Brown;* Benthic diatom composition in wet and dry isolated forested wetlands: Implications for monitoring and assessment	***M.C. Fidalgo de Matos**, J.X. Yang and X.Y. Chen;* Risk of Yunnan wetlands biodiversity under climate change
4:00-4:15	***A.E. Sutton-Grier**, J.P. Wright, S. Qian and C.J. Richardson* Plant functional diversity and nitrogen removal in a restored riparian wetland	***M.-E. Tousignant**, S. Pellerin and J. Brisson ;* Human impacts on the vegetation of a large wetland complex	***E.K. Brennan;*** Moist soil seed abundance on Wetland Reserve Program (WRP) sites in the Mississippi Alluvial Valley of Arkansas	***P. Wolski;*** Assessing hydrological effects of climate change on the Okavango Delta, Botswana
4:15-4:30	***S.K. Chapman**, I.C. Feller and A. Chamberlain;* ^{15}N abundance and nutrient resorption in mangrove ecosystems in Belize and Florida	***C. Dubé**, S. Pellerin and M. Poulin;* Impacts of power line rights-of-way on plant diversity of peatlands	***J.J. Mack**, M.S. Fennessy, J.A. Bishop, M.T. Sullivan;* Using and evaluating the Level 1-2-3 Approach to assess wetlands in the Cuyahoga River watershed of Northeast Ohio	
4:30-4:45	***J.D. Mitchell**, E.F. Brantley and B.G. Lockaby;* Influence of Chinese privet on the biogeochemistry of forested floodplains in west Georgia	***J.M. Karberg** and M.R. Gale;* Subspecies verification of the carnivorous northern pitcher plant (*Sarracenia purpurea*) throughout its geographic distribution: Planning and successful conservation	***L.L. Weishar;*** The ecological and sociological impacts associated with the formation of a new inlet in Nauset Barrier Beach	
4:45-5:00	***E.J. Hanan;*** Multi-scaled patterning of plant-soil-water interactions across three islands and marshes within the prairie and sough landscapes of the Everglades National Park		***C.L. Llewellyn** and M.K. La Peyre;* Examining ^{13}C and ^{15}N stable isotopes in blue crabs (*C. sapidus*) as indicators of marsh equivalence in created and reference marshes	

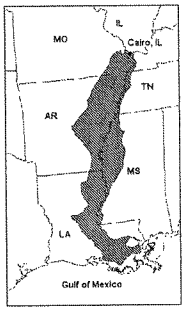
Moist Soil Seed Production on WRP Sites in the Mississippi Alluvial Valley of Arkansas

Elisabeth Brehman
Arkansas Tech University

Background

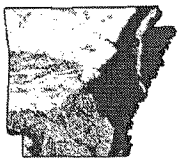
- Mississippi Alluvial Valley (MAV) provides wintering habitat for several million waterfowl annually

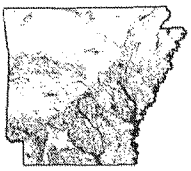




Background

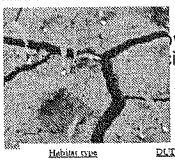
- Historically, 9.8 million acres of bottomland hardwood (BLH) forest in Arkansas
- 89% loss in BLH forest
- BLH forest provide a wide variety of foraging habitat for wintering waterfowl





Background

- Moist soil wetlands
- High seed producers
  - Barnyard grass
  - Flatsedges
  - Beakrushes
  - Some smartweeds
  - Sprangletop
- Production ranges from 300 -1600 kg/ha



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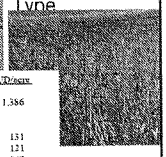
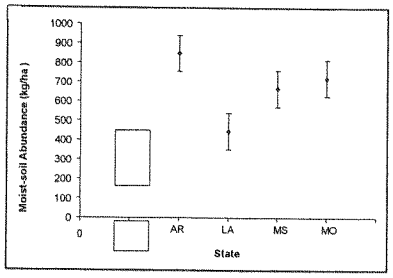
Type



Habitat type	DUD/acre
Moist-soil	1,386
Harvested crop	
Rice*	131
Soybean	121
Milo	849
Corn	970
Unharvested crop	
Rice	29,364
Soybean	3,246
Milo	16,269
Corn	25,669
Millet	3,292
Bottomland hardwood	
30% red oak	62
60% red oak	191
90% red oak	320

Background

- Data moist-soil seed production on public wetlands in the MAV (Kross et al. in press)



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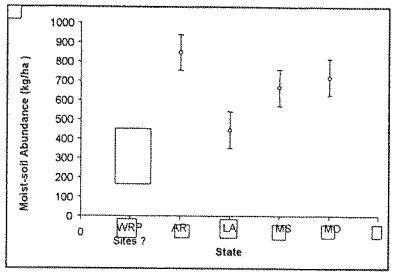
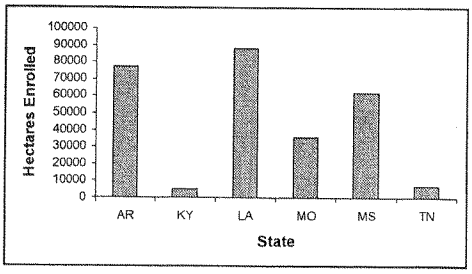


- Little known about private wetlands - WRP

Background

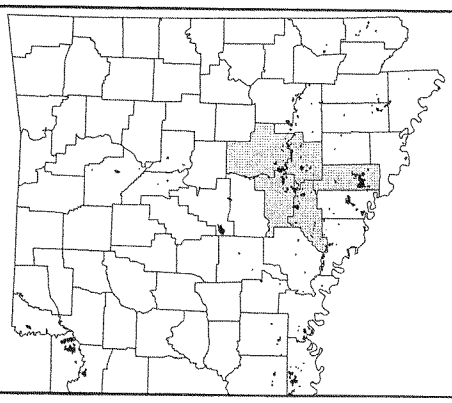
- Arkansas has 2nd highest acreage of WRP lands



Objectives

1. Evaluate MS seed production on WRP sites in the MAV of Arkansas
2. Compare WRP sites to actively managed Wildlife Management Areas
3. Determine the effect of time enrolled in WRP program on MS seed production

Methods



Methods

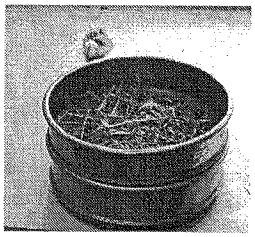
- Sites sampled in late October and early November
- Ten 10-cm diameter core samples taken per site

Methods

- Samples were stored at -10°C until processing
- Samples from each site combined into one aggregate sample per site
- Soaked in a mixture of hydrogen peroxide and water for a minimum of 3 hours

Methods

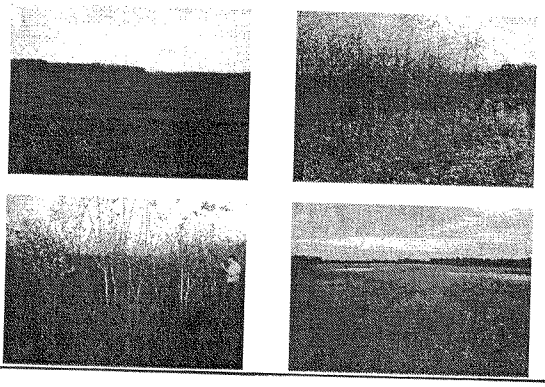
- Samples washed through a series of graduated sieves to remove soil
- Vegetative matter dried for 24 hours at 87°C



Methods

- Used PROC SURVEY MEANS to calculate mean seed production
- Used ANOVA to compare seed production between years and sites (WRP & WMA)
- Used linear regression to determine the effect of WRP age on seed production

Results



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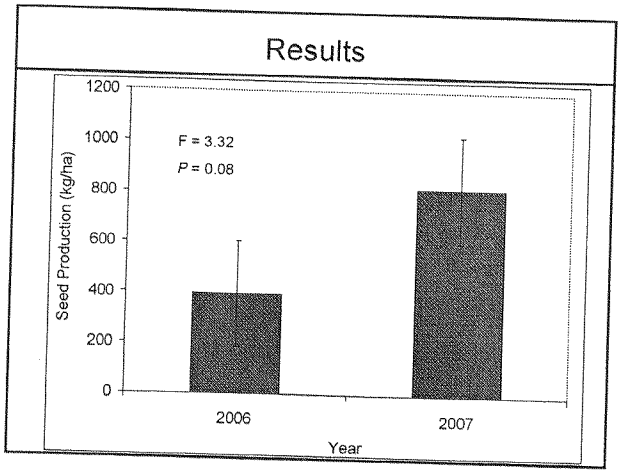

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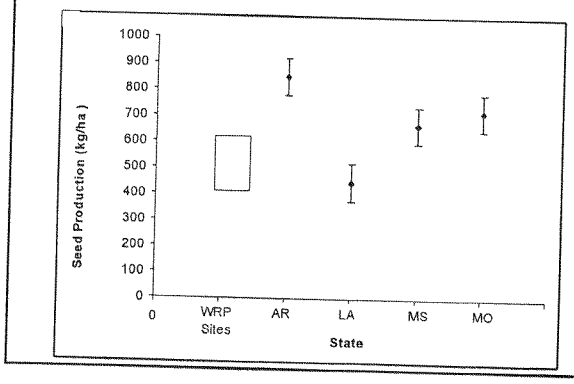
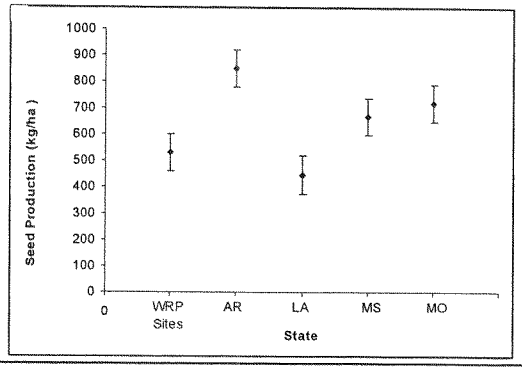


Results



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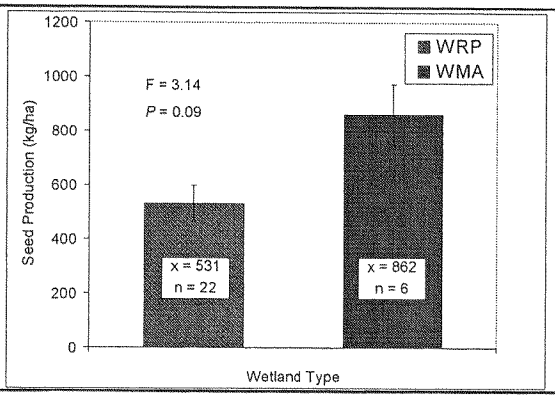

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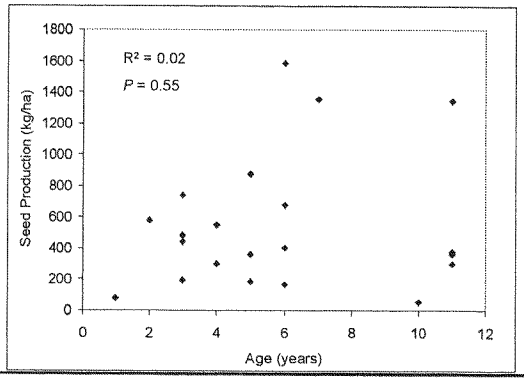
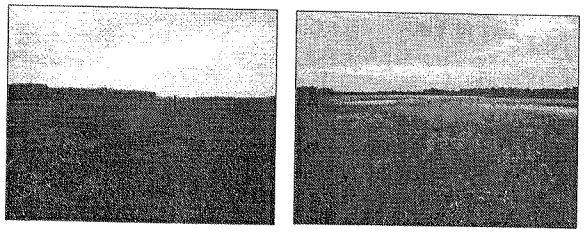


Management Implications

- Currently 77,000 ha of WRP enrolled in AR
  - Approximately 20% (±5) moist-soil wetlands
- Providing 63 (± 15) million DEDs

Recommendations

- Actively manage WRP sites to increase moist-soil seed production AND foraging opportunities



Future Research

1. Continue sampling WRP sites
2. Evaluate seed species/community
3. Manipulate drawdown levels in controlled greenhouse study

Acknowledgements

- Arkansas Tech Undergraduate Research Program
- Rick Kaminski & Jen Kross - Miss. State
- Field technicians & seed sorters
  - Clay Chaney
  - Charlie Ford
  - Benton Gann
  - Paul Tidwell

Questions?