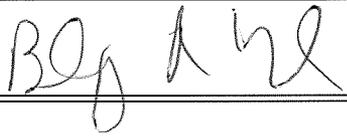| U.S. Department of Agriculture **Work Unit Description AD-416** U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions				Date (Month/Day/Year) 10/05/2012

1. Accession No.	Agency Identifiers		5. Work Unit/Project No.	6. Status
.	2. NIFA	3. LA.B	LAB94171	A = New Project

7. Title
Conservation and Management of Bottomland Hardwood Aquatic Habitats and Forested Floodplains to Enhance Forest and Secondary Biotic Production

8. Performing Organization 1001 - 2010 School of Renewable Natural Resources Agricultural Experiment Sta, Louisiana State Univ	9. Cooperating Departments within State Performing Institution

10. Multistate Project No.	11. Cooperating States

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18. Award Date (Month/Day/Year)	19. Start Date (Month/Day/Year) 10/01/2012	20. Termination Date (Month/Day/Year) 09/30/2016

Goals/Objectives/Expected Outputs

The objectives of this project are to improve the conservation and management of bottomland hardwood forest and improve forest primary and secondary production. Specifically, the first objective is to quantify the relationship between terrestrial ecosystem integrity with water quality, quantity, and the influence of water quality and quantity on forests and forest aquatic biota. The second objective is to quantify the relationship between flood timing with forest and forested floodplain fish and invertebrate production and diversity. The third objective is to develop measures and predictive models for assessing the forest and associated biotic health of bottomland hardwood forest aquatic habitats and forested floodplains.

Methods

Forest stands of increasingly degraded condition by remote sensing and site visits, following condition classes established in Louisiana by the Coastal Wetland Forest Conservation and Use Science Working Group. Ten sample sites will be distributed in three condition classes. Over four flooding cycles, all 30 sites will be sampled monthly for fishes and invertebrates targeting largemouth bass (Micropterus salmoides salmoides and Micropterus floridanus) and crayfish (Procambarus clarkii and Procambarus zonangulus) as keystone indicator species. Fishes will be sampled by boat DC electrofishing and crayfish will be sampled by standard commercial traps. Production will be estimated by size-frequency and/or production-biomass ratio methods. Additionally, physical and chemical habitat characteristics will be measured during each visit by quadrat sampling and in-situ measurements. Side-scan sonar will be employed to map aquatic habitats. Hydrology and connectivity will be measured by coupling bathymetry with remote sensing data in GIS. Additionally a subsample of fishes and invertebrates will have tissue removed for analysis of trophic status by stable isotopic ratios. Data will be analyzed by generalized linear mixed models with forest condition, flooding, and physical and chemical habitat variables as fixed effects and year and season will be treated as random variables. Linear or nonlinear state space models will be applied as necessary, if sequential measurements introduce autocorrelation. Stable isotope data will be analyzed by Hotelling's T-square and residual permutation procedures. Outcomes, specifically forest and habitat conditions, will be linked with system productivity. These findings will be distributed to state and federal stakeholders to guide water management decisions in these bottomland hardwood and forested floodplain systems.

23. Non-Technical Summary

Bottomland hardwood forests and forested floodplain systems provide tremendous ecological and economic benefit to their state, region, and to the nation. Direct benefits include forest products, wildlife and fisheries resources, nutrient processing, water quality improvement, and flood mitigation. Modification of these forests and floodplains through levees, water regulation (e.g., dams), and historic land management decisions has led to forest conditions ranging from healthy and productive to unhealthy and nonproductive. This project will assess the components of the forest that are more important to productivity of aquatic resources, specifically fish and crayfish. In these systems, largemouth bass and crayfish represent two economically and ecologically important organisms linked to the health of the forest. Studying these organisms will offer insights into which components of the forest are critical to address to conserve, manage, and restore these forests and floodplain. This project should provide private and public landowners and managers with specific, manageable habitat components that may be conserved or restored to maintain and improve productivity.

24. Keywords

bottomland hardwood forest; floodplain forest; hydrology; annual flooding; largemouth bass; crayfish; stable isotopes

**** **The Original signed document is on file at this institution.** ****

Signature	Title	Date
Dept: Admin:	Associate Director	10-10-12