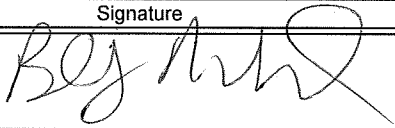


U.S. Department of Agriculture Work Unit Description AD-416 U.S. Dept. of Agriculture, State Agricultural Experiment Stations and Other Institutions			Date (Month/Day/Year) 01/06/2012	
1. Accession No.	Agency Identifiers		5. Work Unit/Project No.	6. Status
	2. NIFA	3. LA.B	LAB94125	A = New Project
7. Title Biological Engineering for Coastal Sustainability: Smart Tools and Ecological Engineering to Enhance Coastal Aquaculture, Habitat and Resource Productivity				
8. Performing Organization 8547 - 2010 Biological & Agricultural Engineering Agricultural Experiment Sta, Louisiana State Univ			9. Cooperating Departments within State Performing Institution	
10. Multistate Project No.			11. Cooperating States	
12. Investigator Name(s) Last Name and Initials) 1. Hall, S.G. 2. Salyers, B.				sent via BFTNET/INTERNET electronic mail systems Date: 1/30/12
13. Project Contact Last Name and Initials: Hall, S. G.		Phone: 225-578-1049 Fax: 225-578-3492		
E-Mail: sghall@agcenter.lsu.edu URL:				
14. Project Type Hatch	15. Contract/Grant/Agreement No.		16. Amount	17. FY
18. Award Date (Month/Day/Year)	19. Start Date (Month/Day/Year) 11/01/2011		20. Termination Date (Month/Day/Year) 10/31/2016	
Goals/Objectives/Expected Outputs Goals: Enhancing design of automated systems and ecologically engineered aquatic environments, from improved conceptualization to commercial applications for economic and environmental sustainability. OBJECTIVE 1: Design and develop automated measurement systems including fleets of autonomous vehicles for use in natural (lakes/coast) and engineered water bodies (aquaculture ponds). OBJECTIVE 2: Optimize design of coastal bioengineered reefs and related ecological engineering approaches to coastal protection and restoration.				
Methods Design of individual autonomous vehicles has shown their usefulness. Future designs will focus on the development of modular and fleet designs. Specific steps for objective 1 will include: 1) Design and development of modular autonomous surface vehicles (ASVs); 2) Design and testing of communication systems between ASVs and with other control systems; 3) Use of these vehicles for aquacultural, water quality and coastal management issues (including integration of sensors on vehicles; algorithms for specific applications such as aquacultural or gradient tracking uses; 4) testing of systems via GIS tracking of GPS signals and correlation with fixed and/or modeled systems. Ecological approaches to coastal protection and restoration (objective 2) will include: 1) Analysis of biological effectiveness of bioengineered reefs; 2) Optimization of design for deployment and growth of such reefs; 3) Analysis of challenges to emplacement and success of such devices; 4) Long term (multi-year) monitoring of growth rates; sedimentation; carbon sequestration; and hydrologic parameters.				
23. Non-Technical Summary Coastal zones in Louisiana and many related areas are under impact from rising sea level, subsidence and erosion of sediments, impacts from navigation, toxic spills, and tropical storms. Sustainability of habitat, coastal resources and aquaculture, and related resources in these areas can be improved by smart tools (e.g., advanced instrumentation and autonomous systems) integrated with relevant biological and ecological engineering. This project focuses on developing appropriate instrumentation and control systems, as well as ecologically friendly techniques, such as bioengineered reefs, to improve productivity and sustainability in aquatic systems.				

24. Keywords

coastal engineering; coastal restoration; coastal protection; ecological engineering; bioengineered reefs; artificial reefs; aquaculture; aquacultural engineering; automated systems; smart systems; biosecurity; instrumentation ; control systems; agricultural engineering; water quality; communication systems; autonomous vehicles;

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

Signature	Title	Date
Dept:  Admin:	Associate Director	1/26/12