**Minutes of the W3004 Annual Workshop - 2016**

**March 22nd, New Orleans, LA**

**Participants:**

Matthew Freeman, Mississippi State University

Hui Gong Jiang, University of Guam

Terry Hanson, Auburn University

Sherry Larkin, University of Florida

Ben Posadas, Mississippi State University

Diego Valderrama, University of Florida

Quinn Weninger, Iowa State University

Julie Falgout, Louisiana Sea Grant

Andrew Ropicki, Texas Sea Grant

Richard Vogel, Farmingdale State College/State University of New York

**Overview:**

The 2016 annual research workshop was held on Tuesday March 22nd as a two-session block on the second day of the Fifth National Forum on Socioeconomic Research in Coastal Systems ­– CNREP 2016 in New Orleans, LA. The first session was used to present the results of recent and ongoing research by W3004 members. In addition, four other papers by W3004 researchers were presented elsewhere during the conference. The corresponding abstracts are appended at the end of this document.

A short business meeting was held on the second session of the workshop. A warm welcome was given to the newest member in the group, Dr. Hui Gong Jiang from the University of Guam. In addition to W3004 participants, the meeting was attended by Julie Falgout (Louisiana Sea Grant), Andrew Ropicki (Texas Sea Grant), and Richard Vogel (School of Business, Farmingdale State College/SUNY). A major thrust of the discussion revolved around potential ways to increase collaboration among project participants in the near future, which could be achieved by jointly submitting grant proposals or by jointly approaching emerging topics such as the impacts of climate change on fisheries and aquaculture, the issue of waste in the seafood industry recently highlighted by researchers at the Johns Hopkins Bloomberg School of Public Health, or the environmental spillovers of offshore aquaculture development in the Gulf of Mexico. The discussion also included plans to prepare a special session showcasing W3004 research at the upcoming 2017 NAAFE forum to be held in La Paz, Baja California, Mexico.

**Research Paper Presentations by W3004 Participants at the CNREP 2016 Forum:**

**Session: *Recreational Fisheries Economics* (Tuesday, March 22, 8:30-10:00 AM)**

**Potential Impacts of Proposed Modifications to the Gulf of Mexico Red Snapper IFQ Program**

**Andrew Ropicki1, Daniel Willard2 and Sherry Larkin3**

1 Department of Agricultural Economics, Texas A&M University

2 Gulf and Southeast Oceans Program, Environmental Defense Fund

3 IFAS Research Office, University of Florida

Amendment 26 to the Gulf of Mexico Fishery Management Council’s (GMFMC) Reef Fish Fishery Management Plan (FMP) established an IFQ system for the commercial red snapper fishery with the following stated goal (GMFMC 2006): The purpose of the IFQ program proposed in this amendment is to reduce overcapacity in the commercial fishery and to eliminate, to the extent possible, the problems associated with derby fishing. The program has succeeded in meeting both objectives with: 1) the number of IFQ accounts falling 25%, and 2) the fishing season becoming year-round with fishers realizing increased dockside prices for their catch (NMFS 2012). However, that is not to say that the program is not without its critics. A survey of RS-IFQ shareholders found that small shareholders were dissatisfied with the program and believed it unfairly benefited larger shareholders (Boen and Keithly 2012). In addition, recent research on the RS-IFQ program found evidence that better connected shareholders were able to attain better prices when trading red snapper allocation (Ropicki and Larkin 2014), which means that social networks affect the value of rights created under the system.

Many of the issues associated with the RS-IFQ program were noted in the GMFMC’s 5-year review of the program (GMFMC 2013). In response to the 5-year review and the recommendations of the GMFMC’s Ad Hoc Red Snapper IFQ Advisory Panel, the GMFMC released a scoping document for Amendment 36 to the FMP outlining a number of potential modifications to the RS-IFQ program to be considered (GMFMC 2015). Some of the potential modifications include: changing the eligibility requirements to participate in the program, changing the rules regarding red snapper discards in the fishery, capping the amount of IFQ allocation that shareholders may own, and restricting the trading of allocation (leasing of quota) through an use-it or lose-it provision. Many of these proposed changes could lead to drastic changes in all aspects of the fishery including: who owns the quota, how quota is traded, how the quota is harvested, and quota prices. Using publically available information on the RS-IFQ program and other catch shares programs along with economic theory, our analysis will evaluate the potential implications of proposed modifications to the RS-IFQ program outlined in the scoping document.

**Session: *Coastal Communication and Curriculum Development* (Tuesday, March 22, 8:30-10:00 AM)**

**Information Exchange between Resource Managers and Vietnamese American Fishing**

**Communities on the Gulf of Mexico**

**Matthew Freeman1, David Hoffman2, Rebecca Schewe3, Brian Shoup4, and Joseph Witt5**

1 Department of Agricultural Economics, Mississippi State University

2 Department of Anthropology and Middle Eastern Cultures, Mississippi State University

3 Center for Policy Research, Syracuse University

4 Political Science and Public Administration, Mississippi State University

5 Department of Philosophy and Religion, Mississippi State University

Collaborative fisheries management requires input and involvement from stakeholders, and so engaging stakeholders often requires understanding and addressing their diversity. Fishing communities along the Gulf of Mexico include diverse racial and ethnic groups, including a large number of Vietnamese Americans involved in all aspects of the seafood industry. Recent disasters, including hurricanes and the BP Macondo oil spill, have highlighted the necessity of effective and efficient information exchange between state and federal agencies and the Vietnamese American fishing community on the Gulf Coast. A lack of information on Vietnamese American fishers also exists in terms of reliable socioeconomic data and their management and governance priorities.

This component of a larger research project focuses on identifying avenues and barriers for communication between Vietnamese American fishers and state and federal fisheries-related agencies in Louisiana, Mississippi, and Alabama. In doing so, we discuss using a combination of 1) interviews with representatives of relevant state and federal agencies, 2) interviews with community organizations and key informants, and 3) focus groups with Vietnamese Americans in different aspects of the fishing industry. A comparison of strategies and needs for information exchange will be discussed across the three states. Collection of this type of data will be used in identifying potential strategies to improve engagement of Vietnamese American stakeholders in the region and be crucial to understand the current and future consequences of management choices for diverse stakeholders.

**Session: *Valuation of Ecosystem Services: Stated Preferences II* (Tuesday, March 22, 10:30 AM – 12:00 noon)**

**Estimating Lost Recreational Use Value of Visitors to Northwest Florida from the Deepwater Horizon Oil Spill using Revealed and Stated Preference Data**

**John Whitehead1, Tim Haab2, Sherry Larkin3, Sergio Alvarez3, John B. Loomis4 and Andrew Ropicki5**

1 Appalachian State University

2 The Ohio State University

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The lost recreational use values (RUV) from the BP/Deepwater Horizon oil spill in the Gulf of Mexico that began April 20, 2010 were evaluated for cancelled recreational trips to Northwest Florida. The Northwest Florida study region was defined to include the following 12 coastal counties: Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin, Wakulla, Jefferson, Taylor, Dixie, and Levy. The impacts were calculated using two economic valuation techniques – the travel cost method (TCM), for single and multiple sites, and the contingent valuation method (CVM) – with primary data collected from surveys and household population estimates from the U.S. Census. The primary data were collected August-September 2011 through Knowledge Networks Inc. with respondents residing in 13 U.S. states that constitute the primary market for coastal tourism to Northwest Florida. The survey gathered information from 2,181 respondents on their recreational visits to the Gulf of Mexico and South Atlantic coastal areas, including detailed information on their most recent trip, past trips, planned future trips and the number of trips cancelled to the study region due to the oil spill. This information was compared to data obtained from personal interviews of 2,540 visitors to the main beach areas in Northwest Florida to confirm the market area and share of visitors accounted for in the resulting estimates. The empirical analysis involved the estimation of a number of models including: (1) single-site demand functions for recreational trips to the Northwest Florida study region, (2) probability-based models of respondents’ willingness-to-pay (WTP) higher trip costs, and (3) multiple-site choice random utility models (RUM). The primary variable in each of these models is the travel costs between a visitors home and the destination site, measured using distance and time (per mile travel costs and the opportunity costs of time and, in some models, the reported transportation and lodging costs). A visitor-reported site quality variable is also important. Each model was estimated with different groups of the sample data and explanatory variables, and each produced unique estimates of lost consumer surplus to Florida households, the measure of economic value upon which to assess lost recreational use value.

**Session: *Economic Impacts of Coastal Business Operations* (Tuesday, March 22, 1:30-3:00 PM)**

**A Trends Analysis of Economic Impacts and Dependency at a Trophy Fishery, 1995-2015**

**Charles R. Parker1, K.M. Hunt1, S.C. Grado2, M.A. Freeman3 and J.E. Henderson2**

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2 Department of Forestry, Mississippi State University

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A mail survey of recreational anglers (n=961) at Lake Fork Reservoir in Texas was conducted from June 2014 to May 2015 to collect information regarding fishing trip characteristics and expenditures. An estimated total of 116,919 one-person, one-day trips were made to the reservoir throughout the year. Expenditures made in the local area by non-local-resident anglers totaled $12,039,570. Using the IMPLAN software, it was found that these direct expenditures generated a total economic impact of $14,718,739. Overall, anglers were willing to pay an additional $19,556,881. This study was a replication of a study conducted twenty years earlier. During the first study (n=848), anglers were estimated to have taken 348,181 one-person, one-day fishing trips to the fishery. Anglers residing outside the local area were found to have spent $14,540,000 which generated $18,559,871 in total economic output in 1995. Anglers were willing to pay an additional $10,679,095 for their trips. The observed two-thirds reduction in angling effort and more than 50% reduction in the real value of expenditures between the two studies were indicative of an economically aging reservoir. To explore the trends in economic impacts of angler expenditures and the local economy’s dependence on the tourism sectors affected by anglers making trips to the fishery, economic impacts and dependency indices were calculated for each year between the two surveys. Expenditure profiles were extrapolated using the producer price index and economic impacts were calculated using multiple IMPLAN models. Economic dependence indices were calculated as a ratio of base output of tourism sectors to total output in the local economy using an automatic social accounting matrix (ASAM). Results from this study sought to improve the utility of economic impact studies by providing a cost effective methodology to annually estimate economic impacts and to determine relationships between dependency and impacts over time. Implications are applicable to both inland and coastal fisheries.

**Session: Multistate Working Group Project W-3004 (Tuesday, March 22, 1:30-1:45 PM)**

**The Economic Impact of Diseases on Aquaculture’s Ability to Feed a Growing World Population**

**Terry Hanson**

School of Fisheries, Aquaculture and Aquatic Sciences, Auburn University

With the world’s population projected to grow to 9 billion people by 2044 the question of how to feed this increasing population arises. Aquaculture, the growing of fish as a crop, makes up more than 50% of all fishery products consumed in the world now and will certainly provide more in the future. New systems are being developed that intensifies fish, shellfish and crustacean production. Sustainability and profitability requires these new systems provide a healthy environment for the fish to keep survival levels high, from stocking to harvest.

This presentation will focus on example projects carried out in the US farm-raised catfish industry over the last seven years. These projects focus on risk management and insurance products for catfish, a Pond-to-Plate value stream project, several new technologies (in-pond raceways, hybrids, vaccines, probiotics) used in three catfish production studies conducted on commercial farms. Results from the studies highlight the economic impact of uncontrolled disease impacts on the viability of aquaculture operations. Each study provides learning points that must be codified into best management practices and standard operating procedures to improve the viability of the US farm-raised catfish industry. New fish diseases occur, but means to investigate and manage them are occurring as well. Eventually diseases and animal health are deciding factors for profitable aquaculture operations.

Good aquaculture operations develop strategies to manage around diseases but the aquaculture industries have a difficult time of getting rid of diseases entirely resulting in negative production and economic implications. Diseases have been controlled in other land animal livestock and new aquaculture technologies must be developed to control them. Without improvements in disease control it will be more difficult for aquaculture to play its part in feeding a larger population in the future.

**Session: Multistate Working Group Project W-3004**

**Landings, Discards, and Fleet Movement across Time and Space in Multispecies Fisheries: An Application to the Gulf of Mexico Reef Fish Fishery**

**Rajesh Singh and Quinn Weninger**

Department of Economics, Iowa State University

This paper develops a dynamic, structural ecological-economic model of a spatially diverse multiple-species fishery. Within a fishing season, agents (fishermen) maximize expected profits by undertaking multiple trips and moving their fleet across various fishing regions and landing ports. Choices are constrained by (i) an individual transferable quota program combined with spatial and/or temporal closures, (ii) endogenously determined stock conditions that vary across space and time, and (iii) a weak-output-disposable harvest technology. Markets for trading in quotas for all species exist. We derive a rational-expectations equilibrium that determines fleet harvesting activity, i.e., multiple-species landings and discards, across time and space. A *no-hotspot* condition dictates landings and discard patterns. In equilibrium, there are no excess harvesting profits to be made through spatial or temporal redistribution of landings and discards (therefore, fishing effort). We use the model to quantify ecological-economic outcomes in the Gulf of Mexico reef fish fishery under various regulatory scenarios. The effectiveness and efficiency of alternative regulations, including adjustments to species-specific seasonal quotas and spatial, temporal closure regulations, etc., is examined. Our work is the first to combine an inclusive and state-of-the art ecological model with a model of rational spatial-temporal fishing behavior. Our ecological-economic model offers a significant advance toward implementation of ecosystem-based fisheries management in a major U.S. fishery.

**Session: Multistate Working Group Project W-3004**

**Economic Recovery Paths of Recreational and Commercial Fishing Sectors from Natural and Technological Disasters**

**Benedict C. Posadas**

Coastal Research & Extension Center, Mississippi-Alabama Sea Grant Extension Program, Mississippi State University

It has been more than a decade since Hurricanes Katrina and Rita devastated the coastal areas in the Northern Gulf of Mexico States in August and September 2005. Results of surveys showed that Hurricane Katrina caused approximately $2.2 million in total damages to the resident Mississippi charter boat fleet. The estimated value of damages to Mississippi municipal and commercial marinas located in the three coastal counties reached $41.38 million. The estimated value of total damages to live bait dealers in Coastal Mississippi reached $4.17 million. The total estimated damages to the resident Mississippi commercial fishing fleet exceeded $35 million.

The closures of significant portions of Gulf federal and state waters to commercial and recreational fishing and closures of beach resources to human uses due to Gulf of Mexico oil spill in April 2010 altered the recreation and consumption decisions of residents and tourists in affected communities. Survey results showed that Mississippi charter boats businesses were shut-down for about 5.37 months in 2010. As a result, the charter boats for-hire businesses lost more than one-half of total sales in 2010. Mississippi commercial fishing businesses were shut-down for about 6.01 months in 2010. These fishing establishments reported less than two-thirds loss in annual total sales in 2010. Eating and drinking places in Mississippi were shut-down for less than a week in 2010. These eating and drinking places stated that they lost more than one-fourth of annual total sales in 2010. The Mississippi live bait and marina firms were shut-down for 2.37 months in 2010. As a result, the live bait and marina businesses suffered a reduction in annual total sales by more than one-half in 2010.

In order to understand the magnitude of the economic impacts of the natural and technological disasters during the past decade to the recreational and commercial fishing sectors, multi-year baseline economic information about each sector in all five Gulf states are currently being compiled from various secondary sources. These long-term baseline secondary data will be used to determine the duration of the economic impacts of the disasters. Econometric analysis of these data will be conducted to determine the rate of economic recovery and measure the economic damages to these affected economic sectors. It is suggested that these assessments be conducted on a region-wide basis, state by state, and species by species.

**Session: Multistate Working Group Project W-3004**

**Estimating Target Densities and Costs Associated with Manual Removal of Invasive Lionfish Stocks in the Western Atlantic**

**Diego Valderrama1 and KathrynAnn H. Fields2**

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Two species of Indo-Pacific lionfish (*Pterois volitans* and *P. miles*) have invaded and rapidly expanded throughout the tropical Western Atlantic since the 1980s. Because eradication is unfeasible, scientists are urging for the implementation of lionfish management plans to reduce the environmental and economic impacts of the invasion. An essential component of these plans is the estimation of target densities for lionfish stocks under which consumption by lionfish does not exceed the productivity of prey fish biomass. Data on prey fish and lionfish assemblages collected from dive trips at Bacalar Chico Marine Reserve (BCMR) in northern Belize in 2014 were used to compute rates of biomass production by prey fish as well as consumption rates by lionfish, leading to preliminary estimates of lionfish target densities beyond which declines in the biomass of native prey species would occur. Production of prey fish biomass was estimated at 326 kg/ha/year. Given that preliminary surveys place lionfish densities at BCMR at 27±9 lionfish/ha, the annual rate of prey consumption was estimated at approximately 270 kg/ha/year. Although local productivity of prey fish populations may be high enough to compensate for lionfish predation, culling programs are still recommended to ensure a target density of around 32 lionfish/ha is not exceeded. These preliminary estimates will be further revised based on the results of continued biological sampling at the reserve and the refinement of ecological models and assumptions on prey fish productivity and consumption rates by lionfish. Information is also presented on the spearfishing catch rates and costs associated with the target densities in order to assess the economic implications of manual removal of lionfish stocks. The methodology used in this research can be adapted to develop local management plans for lionfish containment throughout the invaded range in the Western Atlantic.