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During their recent annual meeting, SERA 30 participants took a closer look at two general topics of growing interest; environmental justice and the economics of water quality. Speakers covered these topics with a broad brush and added important insight to the areas of research and policy issues. The following are summaries of 14 presentations with hyperlinks to both the presenter's final paper and their electronic presentation.

## Topic 1: Water Quality and Related Issues

Introduction:

Water quality has been and remains a critical world-wide environmental issue. Traditionally, water pollution has been classified by its source which can vary from a few, well identified sites (point), to many and poorly identified sites (nonpoint). Over the past several decades, economists have approached water quality and the problem of pollution as a "public good" and have developed the theory and numerous models to explain the behavior of polluters and guide the development of effective laws and regulations.

However, concern about water quality can extend beyond the simple presence of chemical pollutants. It can include crafting better policy to manage confined animal feeding operations (CAFO) and assessing the effectiveness of farmer incentive programs designed to improve the stewardship of farmland and adjacent waterways. It can also include developing incentives to reduce the likelihood of invasive aquatic species or smarter incentives to promote best management practices (BMP). It can even include an improved understanding of long term weather cycles to allow farmers to better manage their crops and irrigation regimes.

The first six papers detail many innovations to assist policy makers and resource managers in addressing the issue of water quality.

Paper 1:
"Measuring the Impacts of Confined Animal Feeding Operations: Technical Issues and Policy Implications." Peter Goldsmith, University of Illinois, Jungik Kim, Korean Land Development Company, Michael Thomas Florida A&M University.

> The U.S. livestock industry faces two critical challenges, one is adapting to the structural changes in the global meat and livestock industry and the second is adapting to the changing norms about how livestock are to be produced. The first involves changes in production systems that involved significant amounts of capital, large scale production units, and integration into highly coordinated supply systems. The second, the subject of this research is how these competitive

large-scale livestock facilities might co-exist with their rural neighbors. To answer this question research was conducted to estimate the economic benefits from swine production to a community and compare these benefits to estimated negative economic impacts these facilities might have on their neighbors.

The results of the research are significant for two reasons. The first that, yes swine facilities do negatively impact the property values of their neighbors, but that impact varies significantly depending on the specific siting location. Second and very important, is that the economic benefits can outweigh the costs when the site is optimally chosen.

The practical application is that we now have a methodology whereby farmers and their communities can identify before hand optimal locations to locate, and if neighbors are negatively affected they can then be correctly compensated. Direct compensation, insurance bonding, and property tax reductions are all tools that can help balance economic impacts with neighbor concerns.

Paper 2:
"The Environmental Quality Incentives Program (EQIP) in Kentucky: Does it Address Environmental Quality Problems?" Angelos Pagoulatos, Ronald A. Fleming and Kyle C. Day. University of Kentucky.

Significant funds are spent by federal and state agencies on programs designed to improve environmental quality within a state, the effectiveness of one such program in Kentucky is the subject of this investigation. The Kentucky EQIP is designed to address animal waste, soil erosion, water quality, and wildlife management concerns. However, project funds are determined by the level of farmer applications and not necessarily linked to the severity of local environmental concerns. This potential detachment of funding and environmental need may be a source of inefficiency.

Results indicate that the effectiveness of the Kentucky EQIP program is ambivalent and depends upon the program area. For example, the soil erosion and water quality EQIP program areas appear to be effective. For these programs EQIP funds went to counties where environmental variables indicate a high potential for soil erosion and/or poor water quality. However, in other cases the programs seemed to fail. Occasionally EQIP funds designated to control soil erosion ended up in counties where soil erosion was not considered a concern. Furthermore, EQIP funding went to counties that did not view soil erosion and water quality as concerns (although this is a minor point because soil erosion and water quality were concerns in those counties; they just were not recognized as such).

On the other hand, the wildlife management and animal waste management program areas of EQIP are clearly not effective. For wildlife management EQIP

funding went to counties that highly ranked wildlife management as a concern although the indicator variables for wildlife management suggest there is no reason for concern. Finally, EQIP funding for animal waste management went to counties that did not consider this a concern. In conclusion, the effectiveness of the EQIP program can be improved by decreasing its reliance on the ranking of local environmental concerns.

Paper 3:
"The Uncertain Value of Perfect ENSO Phase Forecasts: Stochastic Agricultural Prices and Intra-Phase Climatic Variations." David Letson, University of Miami, Guillermo Podesta, University of Miami, and Andres Ferreyra, University of Florida.

The tropical Pacific atmospheric-oceanic phenomenon known as ENSO (El Niño-Southern Oscillation) has important consequences for agriculture. ENSO is a variation between normal conditions and two extreme states associated with warm or cold sea surface temperatures in the tropical Pacific Ocean. Improved ENSO forecasting has important implications for agriculture as a technical improvement that increases the supply of agricultural products. This predictability suggests a potential to tailor agricultural management to mitigate impacts of adverse conditions and to take advantage of favorable conditions. We develop and apply a stochastic, nonlinear optimization framework for evaluating regional ENSO forecasts in the context of other risk sources, such as output price variations. Forecast responses include crop mix, cultivar, fertilization and planting date. Improved climate predictions can benefit agriculture, but their value will depend upon agronomic and market conditions.

Paper 4:
"The Conservation Security Program: Economic and Environmental Effects." John V. Westra, Louisiana State University and Bruce Vondracek and Julie Zimmerman, University of Minnesota.

Farmers receive income from many things they produce in abundance -- food, feed, fiber and fuel. Farmers also may generate environmental benefits (improved water quality and fisheries and wildlife habitat) by managing their operations in certain ways. Unfortunately, farmers have limited ability to quantify the environmental benefits associated with land use practices. Furthermore, farmers may have to forego government commodity payments, thereby reducing their income from working lands, to produce positive externalities.

Provisions under the Conservation Security Program (CSP), if fully implemented, may allow producers to receive some compensation for conservation practices that provide some positive environmental externalities to a watershed. This research used a computer simulation model to examine the relationship between government commodity and conservation programs, agricultural practices, water

quality (nutrient and sediment loss), fish communities and net farm income within two small watersheds -- a coolwater stream and a warmwater stream. We used the Agricultural Drainage and Pesticide Transport (ADAPT) model in relation to land use to calculate in-stream suspended sediment concentrations using estimates of sediment delivery, runoff, baseflow and stream bank erosion, and quantified the effects of suspended sediment exposure on fish communities.

When the agriculture practices that potentially qualify under the CSP were implemented watershed-wide, net farm income remained relatively unchanged in both study areas, relative to current conditions. We found a decrease in "lethal" concentrations of suspended sediment on fish in the coolwater watershed with an increase in conservation tillage and riparian buffers, and a decrease in nutrient application rates to recommended levels. However, land use change in the warmwater watershed did not significantly decrease the effects of suspended sediment on the fish community. This difference between watersheds is likely due to differential tolerance to suspended sediment between coolwater and warmwater fish communities and differences in topography, runoff and bank erosion between the two streams. Despite producers receiving compensation for changing their practices under a potential CSP, annual net farm income declined by 1-3% in either watershed.

Paper 5:
"Integrating Survey Information and GIS Modeling Approach to Develop an Optimal Decision Making Tool for Controlling Water Pollution in the Louisiana Dairy Production Region." Larry Hall, Krishna Paudel, Wayne Gauthier, John Westra, Huizhen Niu, Louisiana State University and Keshav Bhattarai, Central Missouri State University

The dairy industry is struggling in Louisiana for a number of reasons: falling prices for dairy products, consolidation within the dairy industry when smaller farms merge or go out of business, increasing prices for land as cities spread to the countryside, and the cost associated with keeping the water and air around dairy farms clean. Most of the dairy farms in Louisiana are in the southeast part of the state around Tangipahoa parish through which the Tangipahoa River flows. In 2002, dairy farms contributed $207 million dollars to the state economy. Manure is a byproduct of dairy farming and can contaminate the nearby surface or groundwater if not properly managed. The Tangipahoa River was closed for swimming or tubing for several years because of pollution and just recently opened back up for recreation. The best way to get rid of dairy farm manure is to use as fertilizer on crops either on the dairy farm or other nearby farms. The problem with using manure as fertilizer is to use it properly according to the need of crops and spatial characteristics of field.

This study used specialized computer programs to decide on the right amount of manure to apply to a certain crop through a Manure Management Plan. The plan

uses such information as: the amount of nutrients in the manure, the types of storage facilities used on the farm, information about the weather, the length of the growing seasons for the crops, land types, road type, drainage information, soil types, erosion information, and other information supplied by the dairy farmers about their current or future Best Management Practices (BMPs) to control excess manure runoff. Our results indicated that BMPs are successful in reducing water pollution associated with manure application in dairy watershed in Louisiana.

Paper 6:
"Smart Subsidies for Habitat Conservation." Gregory M. Parkhurst, Mississippi State University, Jason F. Shogren, University of Wyoming

Protecting threatened biodiversity hotspots in densely populated areas requires the creation of landscape-scale contiguous reserves and corridors to support viable species populations and ecological processes. Creating contiguous protected areas cannot be accomplished, however, without the voluntary cooperation of private landholders. Their cooperation is more likely if they are compensated for financial losses, e.g., US Conservation Reserve Program.

This research uses the experimental lab to examine the effectiveness of three incentive mechanisms—compulsion, simple subsidies, and smart subsidies, at conserving a contiguous area that spans across private property boundaries. We find that a compulsory policy where people cannot escape the regulatory burden and a simple flat fee subsidy perform similarly. In both cases people protect their lowest cost land. The smart subsidy, which creates a linkage between neighboring landowners conservation decisions by paying an additional *agglomeration* bonus for each shared border between two conserved parcels, outperformed both alternative policies at creating the desired contiguous habitat reserve.

Paper 7:
"The Use of Environmental Assurance Bonds to Reduce the Establishment and Spread of the Invasive Black Carp." Michael H. Thomas, Florida A&M University, Terrill R. Hanson, Mississippi State University, and Nick Stratis, Florida Department of Environmental Protection

The use and/or release of potentially invasive species are a concern to the public and the aquaculture industry. Used to protect channel catfish from flesh eating trematodes, the nonindigenous black carp has been evaluated by the U.S. Fish and Wildlife Service (USFWS) and deemed potentially "injurious" under the terms of the Lacy Act and may be restricted from interstate commerce and eventually removed from U.S. waters. An alternative approach to evaluating these risks is considered and compared to that used by the USFWS. This paper discusses

reasonable options to outright banning of the black carp, including better use of environmental assurance bonds and return-deposit models.

**Topic 2: Environmental Justice, Recreation and Related Issues**

Introduction:

Environmental justice (EJ) can be defined as being concern with avoiding disproportionate adverse human health and/or environmental effects on minority and low income populations. This definition could be broaden to include the assurance of fair and equitable use of public goods and services, such as environmentally dependant recreation. Because public goods are owned by and managed for all citizens, as they become scarce, their distribution becomes an important consideration to policy makers and managers alike.

The following six papers consider the validity of EJ claims in housing, environmental pollution, gentrification, and the distribution of recreationally opportunity.

Paper 8:

"Environmental Justice Revisited: The Case of Kentucky." Ronald Fleming, Angelos Pagoulatos, University of Kentucky and Arun K. Srinivasan, Indiana University.

Environmental racism is the exploitation of minority or poor persons based on environmental quality. This study explores issues of environmental justice by analyzing differences in demographic and socio-economic variables of Kentucky census tracts that host environmentally hazardous waste sites identified by the EPA as Superfund sites. Census data for the years 1980 and 1990 from eighty host and non-host census tracts were analyzed. Earlier studies suggest that the presence of a hazardous waste site is statistically correlated with a higher population of non-white individuals who are statistically more likely to be impoverished. The results of this study suggest that host sites in Kentucky were more likely to be populated by whites. Cleanup of host sites between 1980 and1990 resulted in an in-migration of minorities such that there is no longer any differences in the racial mix of host and non-host sites. Furthermore, while residents of Superfund host sites were made better off during the periods of site clean up (between 1980 and 1990) there was no statistical difference in economic variables between the host and non-host sites. Hence, this study does not support earlier evidence that people in host sites tend to be economically disadvantaged minorities. Nor does this study suggest that cleanup of Superfund sites has made people in these sites relatively better off economically.

Paper 9:

"The Count Data Analysis of Coastal Recreation Visits in Elmer's Island." Nirmala Devkota, Krishna P. Paudel, Larry Hall and Rex H. Caffey, Louisiana State University.

Non-negative and integer nature of recreational trip-counts appear in the form of poisson or gamma distribution suggesting a count data modeling technique. In fact, the non-negative quality of trip demand results in to the truncated data sets (at zero). Therefore, we employ poisson and negative binomial on truncated and un-truncated data in estimating travel demand for coastal recreation in Elmer's Island.

Our paper analyzes the determinants of recreational demand for coastal recreation. The demographic and environmental variables have significant impact on demand. All models showed statistically insignificant impacts of total time and recreation related expenditure on recreational demand of costal wetlands. The findings are not consistent with the results of Hanemann (1987) and Loomis et al. (2000). The unconvincing estimation associated with main variables, travel cost and income; suggest a careful attention toward the model and/or data. Non randomness of the sample may have contributed toward this result.

Paper 10:
"Baltimore's Last Frontier: The Middle Branch Waterfront." Yasmin M. Fozard, Morgan State University.

Over the past 30 years the City of Baltimore's Inner Harbor has undergone a transition from a working class industrial based economy and maritime trade to a white collar, service oriented economy. The services provided are associated with millions of visitors to the Inner Harbor, parks, historic sites and the overall visual aspects of this natural resource. This rediscovered waterfront has made the harbor one of the most important economic and social assets of this city. Until recently the revitalization efforts for downtown Baltimore has depended only on the 1.5 mile-long shoreline of the Inner Harbor. However, this main Inner Harbor segment represents less than 4 percent of the total shoreline, leaving 40 miles of waterfront available for future development.

The Middle Branch of the Patapsco River is part of the remaining 40 miles of waterfront and presently the main focus of city planners, private developers, and community leaders. The common focus of these entities is to generate more private property ownership and attract new, upper income residents to the city.

The focus of this paper is to study the how environmental resources can be improved through the use of enhanced *Visual Quality.* The visual quality of a geographical area is the value that the residents have in the environmental character of the landscape. The visual quality of the Middle Branch communities acts as a catalyst for the economic development and the revitalization of those communities. The geographical landscape of the Middle Branch has a visual quality that is financially attractive to real estate developers and provides city planners with a marketable resource to attract new homeowners. Because of the

universal appeal of waterfront property, upper-income residents are the target markets for developers and city leaders; however the preservation of existing communities is being ignored. These communities have a history that dates back to the 1930s and 40s.

This paper will discuss the importance of the positive visual quality of the Middle Branch and the corresponding economic ramifications as they relate to the existing communities, the developers, and city planners. Furthermore, it will examine how these forces converge to revitalize and sustain this waterfront community.

Paper 11:
"Geospatial Measures for Evaluating Amenity Open Spaces in Urban Communities." Alfredo B. Lorenzo, Erica Ellis and Samuel E. Hand, Florida A&M University

Many urban communities and neighborhoods are struggling to deal with the unforeseen negative consequences of urbanization on quality of life. Of the many consequences, the rapid loss of open and green spaces due to urbanization has become a "hot-button" issue in many U.S. cities and counties. There is increasing evidence amenity open spaces contribute to the health and well-being of residents and disparities in their distribution among communities could become an environmental justice issue.

This study is an initial attempt to determine a set of measures for objectively analyzing neighborhoods and subdivisions for their needs for amenity open/green spaces: locational characteristics, including population density and housing density; land-use density and diversity; accessibility to parks; and proximity to important land resources such as wetlands, preserved prime farmland, and endangered habitats. The use of these measures is demonstrated for eight subdivisions/neighborhoods in the City of Tallahassee, Florida. While this study demonstrates the measures for existing subdivisions/neighborhoods, the measures hold potential for evaluating neighborhood developments at the design and proposal stages. In this respect, the measures may help urban planners and designers, land developers, and policy-makers less arbitrary or conceptual with their analyses and deliberations.

Paper 12:
"Environmental Justice in Southeastern Housing Markets." Sa Chau Ho and Diane Hite, Auburn University.

This paper examines the existence of potential environmental justice issues in the Southeastern United States with respect to house prices, cancer mortality and toxic releases. Environmental justice refers to the notion that there is a bias in terms of environmental quality in favor of wealthy and white communities. For

example, a number of previous studies have found that hazardous waste sites were likely located in areas where disadvantaged groups live.

In this paper, we use location choice of housing as a means to measure environmental justice. In particular, poor or minority households may have to trade off environmental quality for other housing characteristics that are important—or essential to them. A model is developed that studies the interactions among county level house prices, cancer mortality and toxic releases while controlling for confounding demographic factors such as education. The data are obtained from a number of sources, such as the United States Census, the Environmental Protection Agency's total toxic releases and the United States National Institutes of Health data on cancer deaths.

Our findings suggest that poor or minority home buyers are forced more often than their richer and whiter counterparts to accept worse environmental quality in order to obtain certain house characteristics and public goods. In addition, values of statistical life (VSL) are estimated that reflect individual willingness to pay for better environmental quality. We find that the VSLs are higher for wealthier individuals, but this reflects the ability of that group to pay to avoid areas where environmental quality is bad.

Paper 13:
"Multinomial Logit for Recreational Choice Modeling: The Case of Elmer's Island."
Nirmala Devkota, Krishna P. Paudel, Larry Hall and Rex H. Caffey, Louisiana State University.

Random utility model of costal recreational behavior is used to explain individual's decision on recreational choices. A derived utility from a recreational trip is considered to be a function of the expected quality of available alternatives. The quality of trip is measured in terms of individual's characteristics and the characteristics of recreational choices. The function is estimated by using multinomial logit specification using the data on individuals and site characteristics.

Our study shows that, if individual's primary purpose of trip is not only the costal recreations, then they are more likely to choose camping in Louisiana coasts. Similarly, bird watching is popular among those individuals, who visit the coast on the way of other goals. More flexible hours increases the probability of surf fishing reducing the likelihood of offshore fishing. Individuals, who give higher values to importance of environmental quality of the sites, are less likely to choose swimming. However, the individuals giving more value to physical characteristics of the site are more likely to choose camping. The result also states that increase in amount of time that an individual spend on coastal recreation increases the probability of choosing camping or surf fishing. Negative marginal effect of income for camping says the wealthier individual would not choose

overnight camping. Finally, marginal effect of gender dummy (1=female) is negatively related to surf fishing and positively related to swimming and bird watching. The elasticity estimate shows that environmental characteristics of the site has the highest negative effect suggesting that the environmental characteristic of site is very important on recreational choice decision.

Paper 14:
"Using the Distribution of Consumer Surplus to Measure Equity in Recreation: Five Examples in Florida." Michael H. Thomas, Florida A&M University

A review of several recent studies of recreational value (consumer surplus) and economic expenditures generated by resource-based recreational activities shows disproportionably low participation rates by minorities for many of these activities. For example, in Florida, demographic minorities (e.g., African-American, Hispanic and Asian) seldom participate in activities such as beach visits, biking, boating and hunting. Using estimates of value generated to the majority market segment (European-Americans) and assuming comparable participation rates, it becomes possible to estimate the potential economic impact of directed marketing efforts toward minority segments.

A better understanding of minority tastes and preferences for public goods is essential and may return large benefits to both the minority segments and the economy as a whole. Assuming that public managers of natural resources are to serve the entire market, it becomes increasingly important to first recognize these large discrepancies in market participation and second to close the gap, generating increased economic value and efficiency.

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