

Spatial Variation and Social Equity in Shore-based Recreational Fisheries in Key West, Florida.

Variación Espacial y Equidad Social en la Pesca Recreativa en Tierra en Key West, Florida

Variation Spatiale et Équité Sociale dans les Pêcheries Récréatives à Terre à Key West, en Floride

KELSI FURMAN* and STEVEN SCYPHERS

*Northeastern University — Coastal Sustainability Institute
430 Nahant Road, Nahant, Massachusetts 01908 USA.*

furman.ke@husky.neu.edu

s.scyphers@northeastern.edu

EXTENDED ABSTRACT

Introduction

As fisheries management continually strives to define and actualize more holistic management strategies, an understanding of social outcomes and potential inequalities is essential. Previous studies have shown the importance of understanding natural resource-based livelihoods, well-being, and the overall socioeconomic context in which fishers participate (Cinner et al. 2009, Smith and Clay 2010, Colburn and Clay 2012, Daw et al. 2012). In shore-based fisheries, shoreline condition is of particular importance with implications for social equity, including social costs and benefits of fishing opportunities, outcomes, and management. While natural shorelines have been shown to provide a variety of ecosystem services for ecological enhancement (Gittman et al. 2016, Scyphers et al. 2011, 2015), many coastal shorelines have been hardened altering the ecosystem function and subsequent services distributed to nature and humans (Gittman and Scyphers 2017, Gittman et al. 2016). In the United States, Gittman and colleagues found that 14% of shorelines have been hardened with much of the remaining shorelines vulnerable to future habitat loss (Gittman et al. 2015). Yet, little is known about how various user groups fish along various shore types. We hypothesize that access to different shoreline typologies will vary by user group, with low-income communities having highest reliance on public sites and higher-income groups have increased access to private sites such as residential properties or resorts for visitors. While information on fishing effort, catch, and participation in marine recreational fishing is obtained through the Marine Recreational Information Program (MRIP), specifically the Access Point Angler Intercept Survey (APAIS), little remains known about social equity in shore-based fisheries and the implications of shoreline condition. In the Florida Keys, social equity and access are of particular importance for shore-based fisheries due to the wide variety of shore types present, yet it is not presently accounted for in fisheries stock assessments or management plans.

Methodologies

This research aims to examine the following questions:

- i) How does fishing effort and catch vary across shore typologies and socioeconomic status, and
- ii) How do the social and ecological dynamics of shoreline fisheries intersect and are these dynamics socially equitable?

To answer these questions, we conducted intercept creel and social surveys in Key West, Florida to assess angler-specific fishing trip information and fishing behavior to provide greater temporal and spatial resolution data for shore-based fisheries. Specific components of the survey include fishing behaviors (location, frequency, gear, target species, preferred shoreline type), fishing outcomes (catch, consumptive or subsistence behaviors, satisfaction), and socioeconomic and demographic characteristics. Our surveys advanced beyond current MRIP/APAIS approaches by considering: a) fishing effort and catch across different shoreline types, b) detailed social and economic characteristics, and c) high-resolution spatial information to allow GIS mapping and analyses.

More specifically, intercept surveys were designed to assess how social and ecological dynamics of shoreline fisheries intersect and if these dynamics are socially equitable. Specifically, this study built upon Klein and colleague's metrics of equity and considers key aspects of social equity including participation, access, spatial and financial (Klein et al. 2015). Klein describes participation equity as representation of stakeholder groups in participatory conservation and decision-making; access equity as access to natural resources; spatial equity as amount of space on the landscape or seascape allocated to individuals or groups; and financial equity as the amount of income or profitability allocated to individuals or groups (Klein et al. 2015). Specific measures of spatial equity included shoreline type fished, preferred shoreline type, amount of shoreline available for fishing and distance from residence to fishing locations. Measures of access equity included barriers to entry, satisfaction with fishing outcomes and perceptions of policy and regulations. Measures of participation equity included involvement in decision-making, local government, environmental and management councils, while measures of financial equity included annual income and money spent on fishing. Finally, survey respondents were

asked about any barriers preventing or discouraging them from using the shorelines they would like to fish at as a combined metric of the above equity indicators.

Results

We collected 105 surveys along the Key West shore from June 29th to August 9th of 2019. Of the 105 surveys respondents, 45 were Key West residents, 35 were tourists, and 25 were frequent visitors (visit Key West once a year or more). Surveys were collected at 13 different shore-fishing sites and at all times of day, ranging from 6:48 to 22:45. Surveys were distributed in both English and Spanish. Ten were completed in Spanish and 95 in English. Of the 105 respondents, 12 were female and 93 were male, while 69 were white, 14 Hispanic, 15 African American, and 7 Asian. A range of incomes and education were represented, with 44.9% of the respondents making \$50,001 to \$75k or less and 60.8% having a 2 year college degree or less. The average age was 44 years old. Survey respondents were predominantly hook and line fishing with 97 respondents using rods, 3 handlining, 3 cast netting, and 2 flyfishing, and over half (58.1%) said more than 90% of their fishing is from shore. Most respondents were targeting no particular fish species. Of the respondents targeting a specific species, 35.3% were targeting Snappers, with most targeting Gray and Yellowtail. Snappers were the most frequently caught fish, with Gray Snapper having the highest catch of all snapper species. Other fish reported as catch included Grunts, Barracuda, Pinfish, Sharks, such as Nurse Shark and Bonnethead, and Bait Fish.

Data analysis was conducted to examine potential social inequities in fishing outcomes. Results shows that low income community members are significantly less satisfied with fishing regulations than higher income residents (Figure 1). Low income residents are also substantially less satisfied with access for shore fishing, although this trend is not statistically significant. Similar trends emerge across race, with African American community members being significantly less satisfied with both fishing regulations and access for shore fishing compared to those of other races. African American fishers are particularly unsatisfied with access, with 64.29% of African Americans saying they are not at all satisfied with current shore fishing access around Key West (Figure 2). Importantly, low-income and African American community members fish significantly more for subsistence than higher income and white residents, with over a third of these residents fishing for food.

These trends also emerged through qualitative data collected during intercept survey collection. Of access, one local whose family has been here for five generations said:

“access to shorelines is horrible now. Growing up you could fish everywhere around the island but now it’s all privatized and owned by resorts and the tourism industry and you can’t access the shore for fishing.”

Another resident said they shore-fish for food because

“it’s not worth taking the boat out and paying for fuel with such strict regulations – not worth the price for only 5 Gray Snapper.”

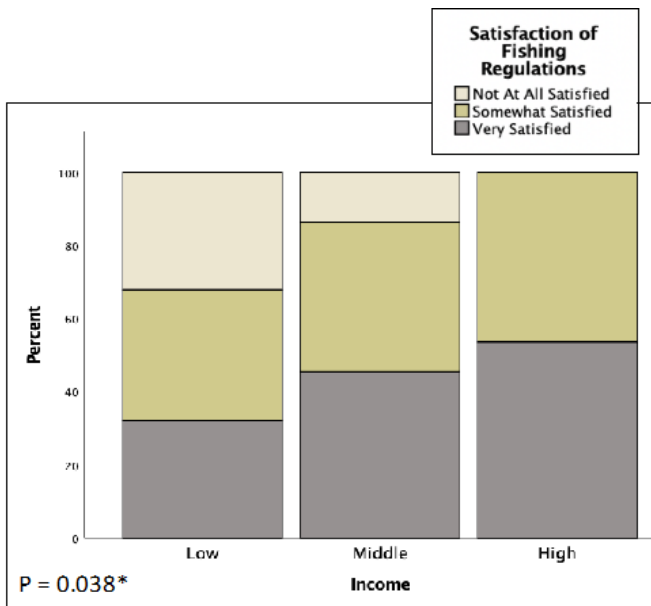


Figure 1. Satisfaction of fishing regulations across income.

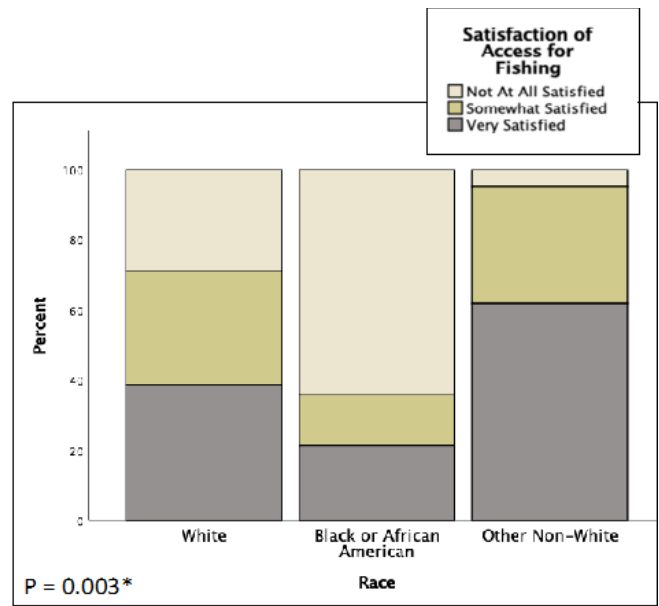


Figure 2. Satisfaction of access for shore-based fishing across race.

Another said,

“how are you supposed to feed a family of 8 when you can only catch 5 fish?”

Conclusions

Environmental justice literature has indicated that existing inequalities exist surrounding access to blue spaces, recreational fishing, and human health (Pulford et al. 2017, Ekkel and de Vries 2017). Despite environmental justice being mandated in fisheries management through the National Environmental Justice Advisory Council, social equity has been understudied and rarely accounted for in formal fisheries management. Advances in the literature have led to a call for greater inclusion of social impact assessments in fisheries as knowledge gaps surrounding these social outcomes have led to data uncertainties in stock assessment (Gutiérrez et al. 2011, Pollnac and Poggie 2008, Scyphers et al. 2019). This research aimed to address these gaps, specifically regarding social equity in fishing access and outcomes in shore-based fisheries. Variations and inequities in fishing outcomes across user-groups may occur by socio-economic constraints, influencing both selectivity and catchability through narrowing access to various gear and shoreline types. Spatial equity, particularly spatial fisheries management, has expressed a linear relationship between equity and conservation goals and success, while social goals of equal distribution and conservation goals of sustainable catch have been shown to produce spatial equity (Klein et al. 2015). With further analysis of this data and expansion of this research we will gain a better understanding of spatial variation and social equity in shore-based fisheries to provide the best possible science for fisheries management.

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