

No. 142, Original

In the

Supreme Court of the United States

STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

Before the Special Master

Hon. Ralph I. Lancaster

**PRE-FILED DIRECT TESTIMONY OF FLORIDA WITNESS
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CONTENTS

I.	PROFESSIONAL QUALIFICATIONS.....	1
II.	SUMMARY OF TESTIMONY.....	1
III.	INTRODUCTION TO REPORT.....	2
IV.	THE LITERATURE REVIEW.....	3
	A. Coastal Fishing Communities.....	3
	B. Apalachicola Bay and River Communities.....	4
V.	THE SURVEY.....	7
	A. The Community-Level Survey.....	8
	B. The Commercial Fisherman Survey.....	9
	C. Survey Design.....	9
VI.	SURVEY RESULTS.....	11
	A. Environmental Connectedness and Place Attachment.....	11
	B. Ecological Satisfaction and Concern.....	12
	C. Occupational Dependency and Occupational Diversity.....	13
	D. Social Capital and Community Identity.....	14
	E. Commercial Fisherman Survey.....	16
VII.	CONCLUSION.....	17

1. I am Dr. Steven Scyphers, and I offer the following as my direct testimony concerning the important relationship between the ecosystems of the Apalachicola Bay and River and surrounding human communities (hereafter communities).

I. PROFESSIONAL QUALIFICATIONS

2. I am an Assistant Professor of Social-Ecological Coupling in the Department of Marine and Environmental Sciences at Northeastern University in Boston and Nahant, Massachusetts. Previously, I was an Associate Research Scientist and National Science Foundation Science, Engineering, and Education for Sustainability Fellow at Northeastern University.

3. I am an expert in social-ecological systems, which draws from the fields of ecology and environmental sociology. Specifically, I study the interactions between coastal communities and ecosystems and have authored a body of scholarly work concerning these social-ecological systems. I currently teach a course on Sustainable Development and have previously taught a course in Marine Conservation.

4. I have been the lead or co-principal investigator on more than \$2 million dollars in research grants from the National Science Foundation, the National Oceanic and Atmospheric Administration, Sea Grant, and the National Academies of Sciences, among others. In addition, I am an appointed member of the Standing Scientific and Statistical Committee for the Gulf of Mexico Fishery Management Council.

II. SUMMARY OF TESTIMONY

5. I examined the bond between the ecosystem and the communities surrounding the Apalachicola Bay and River. I also analyzed the sociocultural characteristics of the communities near the Apalachicola Bay and River and evaluated their vulnerability to environmental harm.

6. To do so, I first assembled and reviewed existing key scholarly literature regarding natural resource communities and, drawing upon that literature, developed a quantitative telephone survey which was conducted of 1,214 community residents in Franklin, Gulf, Liberty, and Calhoun counties and 92 commercial fishermen in Franklin and Gulf counties.

7. After studying, surveying, and analyzing these communities, I reached four principal conclusions:

- The communities surrounding the Apalachicola Bay and River highly value and are dependent upon healthy ecosystems.
- Commercial fisheries in the region are characterized by trans-generational family legacies, significant social capital and cooperation, and strong fishing traditions.
- The loss of oyster reefs and accompanying fishing opportunities poses a significant threat to the identity and sustainability of the communities surrounding the Apalachicola Bay.
- Persistent degradation of the overall ecology or ecosystem services provided by Apalachicola Bay and River would have negative impacts on individual livelihoods and the well-being of the community.

III. INTRODUCTION TO REPORT

8. In connection with this litigation, I prepared a report titled *Societal Values, Environmental Connectedness, and Concern in Apalachicola Bay and River Communities*. A true and accurate copy of this report is Exhibit FX-799. My work and report were peer-reviewed by Dr. J. Steven Picou, Distinguished Professor of Sociology and Director of the Coastal Resource and Resiliency Center at the University of South Alabama.

9. Georgia's expert Dr. Robin Cantor has criticized my report, but her criticisms are technically and substantively flawed. Dr. Cantor is not an expert in the field of sociology, has not put forth her own approach for assessing the sociocultural value of the communities nearby the Apalachicola Bay and River, and has not produced any substantive data to dispute my findings.

IV. THE LITERATURE REVIEW

10. As is customary in my field of study, my analysis began by conducting a review of published academic literature on coastal fishing communities, as well as previous sociocultural studies and books describing the Apalachicola Bay and River region of Florida. This literature review informed the quantitative survey I developed, serves to contextualize the results of the survey I conducted, and provides a mechanism to compare the survey results to relevant studies and communities.

A. Coastal Fishing Communities

11. Whether they are the communities of oystermen on Florida's Gulf Coast, cod fishermen in Massachusetts, or lobstermen in Downeast Maine, coastal fishing communities exhibit unique characteristics.

12. In many of these places, fishing provides an important source of jobs and food for local residents. To be sure, the reliance on harvesting, processing, and consumption of fisheries and seafood resources provides job opportunities and economic revenues.

13. But coastal fishing communities are marked by more than economics. They have important social value. Fisheries and fishing occupations often become an important part of individual personal identity, as well as part of the shared social fabric of the community. To this point, guiding federal fisheries policies, such as the Magnuson-Stevens Fisheries Conservation and Management Act, make clear that fishing communities are not defined only by their economic productivity.

14. To understand the sociocultural value of the fishing communities surrounding the Apalachicola Bay and River, I looked to published social science literature regarding natural resource communities (NRCs). Based upon that literature review, it is apparent that NRCs share unique characteristics, such as:

- **Resource Dependency.** Typically, NRCs are highly reliant upon extracting resources (e.g., fishing) for jobs and economic revenues. Poverty is typical in NRCs because of inherent environmental variability and limited occupational alternatives.
- **Place Attachment and Environmental Connectedness.** Members of NRCs are inherently attached to their particular bay, harbor, or port of residence. In many instances, these individuals carry on a multi-generational family legacy of fishing.
- **Ecological Knowledge.** Those involved in coastal fisheries often have a detailed understanding of the structure and functioning of their local ecosystems; this knowledge is traditionally passed down from the previous generation and contributes to a deep institutional memory.
- **Social Capital.** Members of NRCs often form close relationships and share feelings of mutual responsibility to cooperatively manage and sustain the natural resources they share.
- **Social Resilience.** Although NRCs are highly vulnerable to environmental declines and poverty is not uncommon, these communities can exhibit surprising adaptive capacity or social resilience.
- **Social Disruption.** Declines in environmental conditions can have severe negative impacts on both individual and community levels. The cumulative effect of these individual and community impacts can result in the loss of cultural traditions.

These characteristics provide the conceptual foundation for the quantitative survey I developed.

B. Apalachicola Bay and River Communities

15. A unifying theme of the previously published literature on the Apalachicola Bay and River region is that the ecology of the Apalachicola River and Bay provides a critical and unique support system for the local communities and tourists. The Apalachicola Bay and River region of Florida has been recognized worldwide and has been designated as an Outstanding Florida Water, National Estuarine Research Reserve, and United Nations Education, Scientific, and Cultural Organization (UNESCO) International Biosphere Reserve.



Figure 1. Welcome sign in Apalachicola highlighting its identity as the “Oyster Capital of the World”

Figure 1 is a true and accurate copy of an image I located on the blog of the mayor of Apalachicola, Florida, <http://mayorvanjohnson.blogspot.com/2016/10/apalachicola-city-commission-meets-today.html>.

16. The communities surrounding Apalachicola Bay depend upon and celebrate their fisheries resource. For example, the community of Apalachicola self identifies as the *Oyster Capital of the World*, and it hosts the annual Florida Seafood Festival, a showcase of local seafood that attracts thousands of visitors with oyster eating and shucking contests.

17. Historically, the oyster resources of Apalachicola Bay have been a cornerstone of the identity and livelihoods of those living in the region. The current oyster fishery has retained several century-long traditions including a predominantly small-boat fleet and a harvesting approach using hand tongs. Similarly, many oystermen are generational and learned the trade from their fathers and grandfathers.

18. The Apalachicola Bay oyster fishery has traditionally been considered one of the most successful and sustainably managed. In the past, Apalachicola oysters accounted for 90% of Florida’s supply and 10% of the oysters sold in the United States.



Figure 2. Historical (left) and recent (right) photographs of oyster tonging in Apalachicola Bay.

These pictures are true and accurate copies of images I located at the following websites:

Left: State Archives of Florida, Florida Memory, <https://www.floridamemory.com/items/show/6899>

Right: New York Times, <http://www.nytimes.com/slideshow/2013/06/03/us/20130603-OYSTERS-2.html>.

19. Likewise, the communities surrounding the Apalachicola River celebrate their cultural histories and host immense recreational resources on their unique waterway. Fostered by historically vast wetlands, the tupelo gum tree exists throughout the Apalachicola River, and its flowers yield the highly desired Tupelo honey. The Apalachicola River region is one of the few places in the world where Tupelo honey is produced commercially, and some families have been harvesting it for over 100 years.



Figure 3. Tupelo tree blooms (Left) and honey beehives (Right) in Wewahitchka, Florida in 1960.

These figures are true and accurate copies of images I located on the following website, which credit the photographs to Charles Barron: State of Florida Archives, Florida Memory, <https://floridamemory.com/items/show/77622>; <https://floridamemory.com/items/show/255931>.

20. As informed by the literature review, it is apparent that the communities surrounding the Apalachicola Bay and River are natural resource communities. These communities depend upon the health of the ecosystem for their identity and well-being. Numerous studies show that disturbing a functioning ecosystem can severely disrupt the associated human communities. The impact of ecosystem degradation transcends economic consequences and threatens sociocultural well-being. Accordingly, it is important to consider the sociocultural values of the communities surrounding the Apalachicola Bay and River.

V. THE SURVEY

21. In order to collect the data necessary to quantitatively analyze the sociocultural values of the communities surrounding the Apalachicola Bay and River, a telephone survey was conducted of residents in Franklin, Gulf, Liberty, and Calhoun counties. The survey was sponsored and funded by the Florida Department of Environmental Protection and conducted at my direction by the University of North Florida Public Opinion Research Laboratory (PORN) through the use of Computer Assisted Telephone Interviewing (CATI) at a 27-station polling

laboratory. The survey consisted of both a community-level survey, as well as a targeted survey of commercial fishermen with licenses in Franklin or Gulf counties.

22. Descriptive data and research studies are widely used in fisheries and environmental management. Testing explicit hypotheses was not a goal of my research, and the quantitative data collected and conclusions drawn are no less reliable as a result. Dr. Cantor attempts to criticize my survey research on the basis that it lacks a stated hypothesis. But for the reasons just stated, this criticism is misplaced.

A. The Community-Level Survey

23. The community-level survey consisted of 1,214 randomly selected adult residents in Franklin, Gulf, Liberty, and Calhoun counties. These four counties were geographically selected for inclusion because they include the communities most closely tied to the ecosystems of the Apalachicola Bay and River.

24. The community-level survey was conducted from September 8, 2015 through September 21, 2015 utilizing the Random-Digit-Dialing methodology of landline and cellphone numbers provided by Scientific Telephone Samples.

25. The survey results were weighted by age, gender, education, and race to the estimated 2014 American Community Survey from the U.S. Census Bureau demographics for adult residents in Franklin, Gulf, Calhoun, and Liberty counties.

26. For a representative sample with a low margin of error, the survey was purposefully designed to include approximately 1,200 respondents, which is widely considered an optimal and statistically robust sample size. A control group was considered but not utilized because there is simply not a reasonably comparable community suitable for comparison.

B. The Commercial Fisherman Survey

27. The commercial fishermen survey consisted of 92 commercial fishermen with licenses in Franklin and Gulf counties. The commercial fishermen survey was conducted from September 14, 2015 through September 24, 2015 utilizing phone numbers drawn from a licensing database provided by the State of Florida's Fish and Wildlife Conservation Commission, which included the contact information for oyster harvesting permit holders and seafood products licensees in Franklin and Gulf counties. The survey results were not weighted (unlike the results of the Community-Level Survey).

C. Survey Design

28. The survey instruments were designed to primarily measure the concepts of environmental connectedness and place attachment, ecological satisfaction and concern, social capital, recreational behaviors, and expected impacts of environmental degradation. Survey questions were modeled after questions used in peer-reviewed, published scientific research.

29. Prior to conducting the surveys and in conjunction with the design of the survey instruments, I traveled to Franklin, Gulf, Liberty, and Calhoun counties to conduct a scoping trip. During that scoping trip, I conducted anonymous interviews with various residents and stakeholders in the region. This scoping research allowed me to assess the terminology and concepts that I would test in the survey. Scoping research helps to minimize the potential for bias in a survey because it allows the surveyor to confirm that survey respondents understand what is being asked in the same way it is to be interpreted by the researcher.

30. For certain survey questions, the survey instruments utilized scaled response options, which permitted respondents to select an answer among several response options (e.g., respondents were asked whether they strongly agree, somewhat agree, somewhat disagree, or strongly disagree with a given assertion). Dr. Cantor criticized my use of scaled ratings on the

basis that survey respondents typically avoid a particular end of the scale. This criticism is rooted in economic surveys (e.g., in willingness-to-pay surveys, respondents fear being perceived as either too frugal or too extravagant so they avoid responses on either ends of a scale) and is misplaced for multiple reasons. First, this survey utilized ordered categorical responses variables (e.g., strongly agree, somewhat agree, etc.), which were converted to Likert-type scale values (e.g., numerical values) during analysis. Second, high mean values for most questions indicates that a central tendency bias is unlikely. Furthermore, if Dr. Cantor's assertion that bias toward middle responses existed, the already high mean responses for sociocultural values, connectedness, and concern could even be underestimates.

31. The survey includes statistically robust and scientifically valid response rates. Having an adequate response rate is important to ensure that the survey adequately reflects the population being surveyed. To calculate the survey response rates, I relied on standard methodology used in my field. I took the total number of completed surveys and added to it the number of survey's that were partially completed. Then, I divided that number by completed surveys plus partial surveys plus the number of people who refused to answer the survey. The results of the calculation yielded a response rate, for instance, of approximately 36 percent on the Community Community-Level survey. My method is similar to those used by the Association for Public Opinion Research (AAPOR), which is a respected authority in the public polling field. The response rate calculation method is expressed below.

- $$\frac{\text{Completions} + \text{Partial Completions}}{\text{Completions} + \text{Partial Completions} + \text{Refusals}} = \text{Response Rate}$$

32. The results of the calculation yielded response rates of 36% for the community-level survey and 66% for the commercial fishermen survey.

33. Dr. Cantor attempts to criticize my survey research on the basis that it lacks an adequate response rate. Dr. Cantor's criticisms are misplaced because, in calculating the response rate herself, Dr. Cantor did not properly exclude all attempted contacts which skewed her own response rate calculations. Essentially, Dr. Cantor calculated lower response rate numbers than I did because she was over-counting attempted phone calls.

VI. SURVEY RESULTS

34. Both the community-level and commercial fisherman surveys show that the communities surrounding the Apalachicola Bay and River bare the hallmarks of natural resource communities.

35. The survey demographics reveal low levels of household income and formal education. In the communities surrounding the Apalachicola Bay and River, more than 45% of households earn incomes below \$45,000 per year. Further, more than 40% of community-level survey respondents attained a high school diploma or less of formal education. Among commercial fishermen, these same values soar greater than 65%.

A. Environmental Connectedness and Place Attachment

36. The community-level and commercial fishermen surveys measured respondents' connectedness to nearby ecosystems. These values were high across the communities surveyed.

37. Over 80% of residents of the communities surrounding the Apalachicola River and Bay feel that no other place compares to the Apalachicola River and Bay for outdoor and recreational activities. Likewise, over 80% of residents of the communities surrounding the Apalachicola River and Bay utilize the Apalachicola Bay on a monthly basis.

38. Place attachment values were also high among residents and commercial fishermen. Over 80% of residents of the communities surrounding the Apalachicola River and

Bay plan to be a resident of the community for years to come. More so, nearly 97% of commercial fishermen plan to be a resident of the community for years to come.

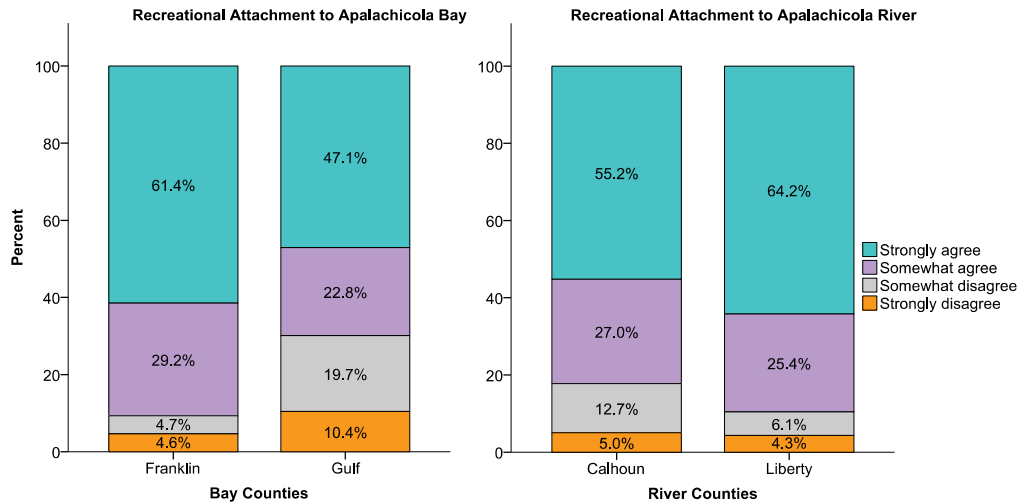


Figure 4. This is a true and accurate graphical depiction of a survey response by county to a question assessing the recreational attachment, as a form of place attachment, among resident to Apalachicola Bay and River ecosystems.

B. Ecological Satisfaction and Concern

39. The community-level and commercial fishermen surveys also measured respondents' ecological satisfaction and concern.

40. In contrast to the strong feelings of environmental connectedness and place attachment, only a small minority of residents were satisfied with the current health of the Apalachicola Bay and River. To this point, 48% of residents of Franklin County were not at all satisfied with the health of the Apalachicola Bay, and only 6.2% of residents of Franklin County were more satisfied with the health of the Apalachicola Bay as compared to five to ten years ago.

41. Further, many residents were concerned about further declines in fisheries and seafood resources. For example, 61% of residents in Liberty and Calhoun counties and 82% of residents in Franklin and Gulf counties strongly believe that substantial declines in the fisheries and seafood resources of Apalachicola Bay would harm the community's well-being. Over half of residents in Franklin and Gulf counties strongly believe that substantial declines in the

fisheries and seafood resources of Apalachicola Bay would harm their economic livelihood. Restated, community residents consider the fisheries and seafood resources of Apalachicola Bay to be more important to their community's well-being than their economic livelihood.

42. Persistent degradation of the ecosystem services provided by Apalachicola Bay and River would have negative impacts on both individual and community well-being. Many scholars and political leaders have highlighted the resilient and hardworking nature of the residents of the region. Yet, as demonstrated by the responses highlighted above, community residents overwhelmingly believe that declines in the resources of Apalachicola Bay would harm their community's well-being.

C. Occupational Dependency and Occupational Diversity

43. Coupled with this ecological concern, both the community-level and commercial fisherman surveys indicate high levels of occupational dependency on environmental conditions and low levels of occupational diversity in the region.

44. To this point, 54% of respondents in Franklin County agreed that their job is dependent upon environmental conditions of the Apalachicola River or Bay. Only 26% of commercial fishermen surveyed agreed that they had many career options available if they decided to no longer be a fisherman. Further yet, 68% of commercial fishermen surveyed had a high school diploma or less of formal education.

45. Considering the high levels of poverty and low levels of occupational diversity in the region, the survey results implicate serious social vulnerability for residents.

46. Dr. Cantor attempts to criticize my research on the basis that it purportedly overstates the potential for social disruption resulting from harm to the regions' fisheries. Dr. Cantor suggests that residents could simply find work elsewhere. This criticism is misplaced

because it assumes that individuals employed in the Apalachicola Bay or River fishing industry desire and could find other employment without far-reaching consequences to their communities.

D. Social Capital and Community Identity

47. In addition to occupational dependency, the communities surrounding the Apalachicola Bay and River are dependent upon and highly value healthy ecosystems for their shared community identity.

48. Specifically, 86-89% of residents consider the environmental health of the Apalachicola River or Bay to be very important for their community's identity. Likewise, more than 75% of residents of the communities surrounding the Apalachicola Bay and River consider Apalachicola oysters "somewhat" or "very important" for themselves and their families. Notably, more residents viewed oysters as somewhat or very important for community identity than somewhat or very important for community economy.

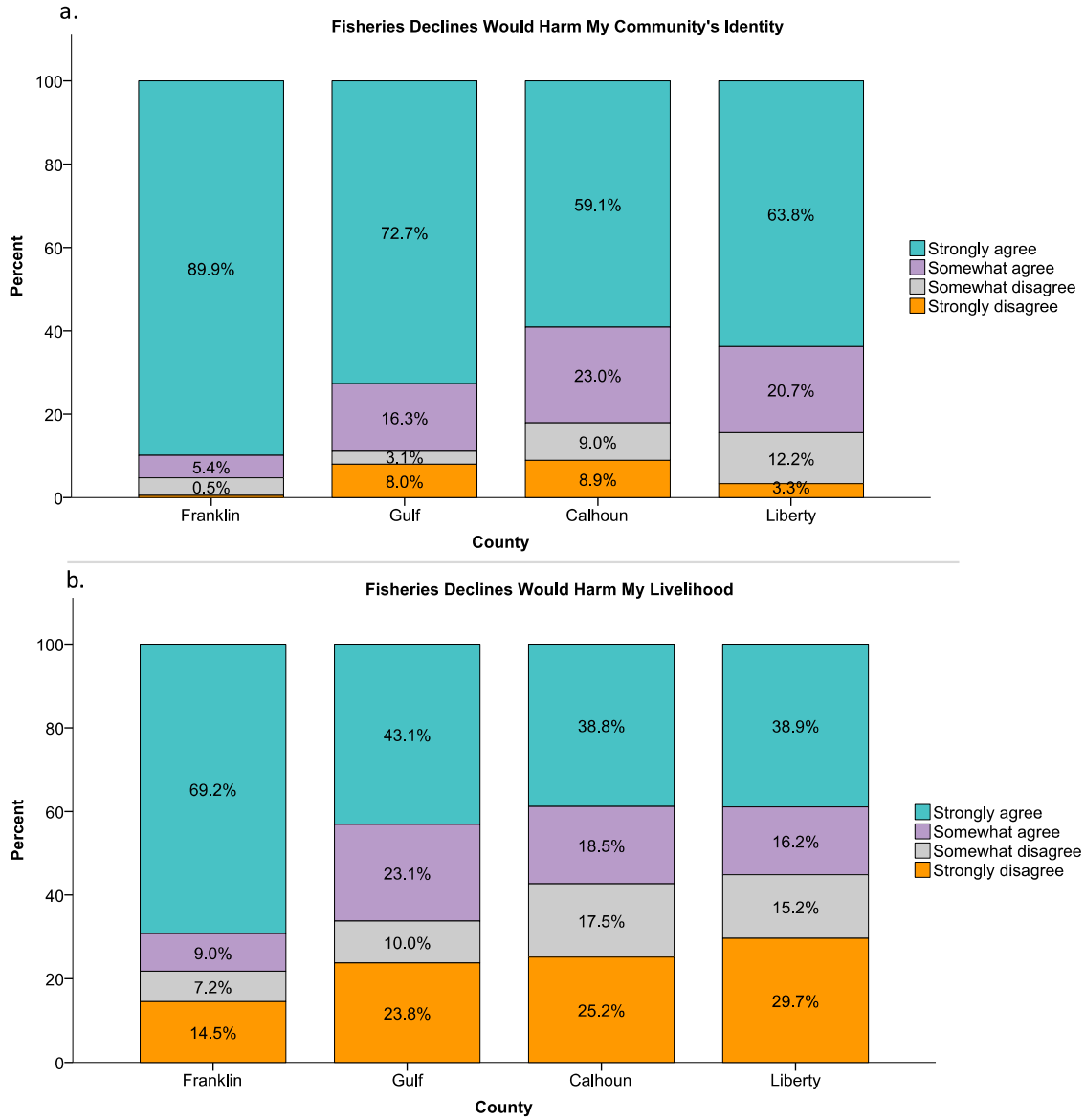


Figure 6. This a true and accurate graphical depiction of a survey response by county to a series of questions assessing concern that declines in Apalachicola Bay fisheries would harm community wellbeing (top) and personal livelihoods.

49. The same holds true for residents of the communities surrounding the Apalachicola River. Of those survey respondents located in Liberty and Calhoun counties, 67% consider Tupelo honey very important for their community's identity, while only 52% consider it important for their community's economy.

50. Related to these points, Dr. Cantor attempts to criticize my research on the basis that it provides "no demonstration of a reduction in economic values." But I did not attempt to quantify any economic losses occurring in the communities surrounding the Apalachicola Bay and River. Rather, as demonstrated by the survey responses highlighted above, I studied sociocultural values in the communities surrounding the Apalachicola River and Bay. These values are meaningful, as well as worth studying and communicating. As best stated in the World Health Organization's Millennium Ecosystem Assessment: "People and communities obtain many non-material benefits from ecosystems." *See* FX-653 at 5.

- a. Exhibit FX-653 is a true and accurate copy of the WHO's 2005 Millennium Ecosystem Assessment: Ecosystems and Human Well-Being. This document, which I downloaded earlier in 2016, is available online at: <http://www.millenniumassessment.org/documents/document.357.aspx.pdf>. The Millennium Ecosystem Assessment was initiated in 2001; its objective was to assess the consequences of ecosystem change for human well-being and the scientific basis for action to enhance conservation and sustainable use of those systems and their contribution to human well-being. The WHO is the United Nations' public health arm.

E. Commercial Fisherman Survey

51. Finally, to further highlight this important group of stakeholders, commercial fishers were asked a series of supplemental questions. The responses to these questions further

demonstrate that the community surrounding the Apalachicola Bay possesses the traits of a coastal fishing community.

52. Commercial fisheries support financial livelihoods as well as historical legacies. Over 75% of commercial fisherman surveyed considered fishing part of their family heritage, which demonstrates that commercial fishermen in the region have trans-generational values.

53. Cooperation and social capital amongst fishermen was also common. More than 80% commercial fisherman surveyed have been involved with the building or maintenance of boats with other fishers. This shows that commercial fishermen in the region have high levels of cooperation, which is a key characteristic of sustainable fisheries.

VII. CONCLUSION

54. As natural resource communities, the communities near the Apalachicola Bay and River depend upon the health of the ecosystem for their community identity and well-being.

55. The overwhelming evidence I have reviewed—including previous studies I evaluated and the survey research I conducted—indicates that further environmental degradation of the Apalachicola Bay and River, in the absence of ecosystem restoration, would result in substantial sociocultural harm to the surrounding region and communities.

56. The communities surrounding the Apalachicola Bay and River have significant sociocultural value, and this value should be considered in deciding this case.