

NOAA Fishery Observers and Vietnamese American Fishers in the Southeastern US

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Abstract

The National Oceanic and Atmospheric Association (NOAA) Observer Program places scientist-observers onto commercial fishing vessels to collect data regarding catch and report violations of relevant regulations. This study examines the experience of Vietnamese American fishers in Louisiana, Mississippi, and Alabama with this federal observer program. It concludes that current observer training inadequately addresses potential language and cultural barriers between fishers and observers, undermining the potential of the observer policy. Based on these findings, it is recommended that observer training be expanded to include cultural sensitivity training and foreign language resources.

Keywords: fisheries, observers, ethnicity

Highlights:

- Language and cultural barriers between observers and Vietnamese American fishers are a significant challenge to the Observer Program
- Current observer training inadequately addresses cultural sensitivity and foreign language preparation
- Recommend that observer training include sensitivity and diversity training
- Recommend that regional offices provide basic support for foreign language communication

1 Introduction

This study examines the U.S. federal fisheries observer program, specifically the experience of Vietnamese American fishers on the Gulf Coast with observers. Data collected by professional observers onboard commercial fishing vessels provides the foundation for federal fishery management decisions as well as reported violations of marine policy. Effective fisheries management demands valid and reliable data, and observers are one of several potential data collection techniques including electronic monitoring, industry provided data, and hybrid approaches. Each form of data collection has relative strengths and weaknesses ¹⁻⁸: observer data may be vulnerable to human error and can be costly, electronic monitoring is lower cost but may allow “cheating,” and industry data may be open to fraudulent reporting. However, the observer program is a lynchpin in fisheries management and it is crucial to maximize the reliability and validity of observer data. Conflicts and challenges between fishers and observers may threaten this data collection and undermine the successful operation of the program^{1,2}. This study examines potential challenges to the observer program with a large population of ethnic and racial minority fishers in the U.S. Gulf Coast.

Vietnamese Americans play a very large role in the Gulf Coast fishing industry, composing approximately 80% of participants in the Gulf Coast shrimping industry ⁹, about 30% of all fishers in Louisiana ¹⁰, 50% of all fishers in Mississippi ¹⁰, and about 50% of all fishers in Alabama ¹¹. Previous studies have suggested that observer programs may face particular challenges with racial and ethnic minority

fishing populations ¹, therefore this study focused on three key research questions:

1) What training is currently provided for observers regarding cultural diversity and foreign language preparation? 2) How satisfied are Vietnamese American fishers with their experiences with NOAA's Observer Program? And 3) What specific challenges have Vietnamese American fishers faced with NOAA's Observer Program? The study first provides an overview of the National Oceanic and Atmospheric Association's (NOAA) Observer Program and briefly reviews alternative data collection options before analyzing observer training manuals, surveys, and survey and focus group results to answer the research questions.

2 Observer Program Overview

NOAA's Observer Program places scientific observers on commercial fishing vessels for an extended period of time. A smaller number of observers are also placed within commercial seafood processing facilities. The program has two primary goals: 1) data collection on fishing catch and 2) compliance monitoring.

Firstly, observers are "professionally trained biological scientists gathering first-hand data on what's caught and thrown back by U.S. commercial fishing vessels" ¹². Observers count and measure a sample of what is caught by vessels. This data is used to estimate fish populations, set fishing quotas, and provide the foundation for management of fisheries. Similar observer programs exist for some states, nations,

and international commissions. This study specifically examines the NOAA Observer Program.

In addition to data collection, observers also “support compliance with fishing and safety regulations”¹² and are authorized to report any observed violations. While “observers are not enforcement agents”¹³, they are supposed to document and report potential violations to NOAA’s Office of Law Enforcement. Violations include things such as failure to properly discharge waste from vessels, comply with protected species regulations, or meet safety requirements.

The legislative mandate for NOAA’s Observer Program is provided by several federal statutes: the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, Marine Mammal Protection Act, Fish and Wildlife Coordination Act, and Federal Power Act¹⁴. These statutes define the need for the “best scientific information to be used as the basis for management actions”¹⁴, which is used as the regulatory justification for the observer program. The NOAA Observer Program operates exclusively in federal waters that extend from between three to two hundred nautical miles from all U.S. coasts¹⁴.

The observer program is administered through six regional offices that provide training and coordinate placement of observers¹⁵. The National Observer Program provides guidance and coordination for the regional programs. Observers are

employed by private companies contracted to provide observer services, rather than by NOAA. In 2016, there were 902 observers ¹².

2.1 Policy Background for Observer Program

Passed in 1976, the Magnuson-Stevens Fisheries Conservation and Management Act (MSA) provided the foundation for NOAA's National Observer Program and established a collaborative and regional approach to fisheries regulation. To accomplish the goals of the MSA, the National Marine Fisheries Services (NMFS) was established within NOAA and regional Fisheries Management Councils that create fisheries management plans were established ¹⁶. The role of observers was defined as providing the data necessary for development of regional fisheries management plans.

The MSA was reauthorized and amended in both 1996 and 2007. The 1996 Sustainable Fisheries Act (SFA) amendment outlined a "precautionary approach to fisheries management, emphasizing the role of science in management and conservation" ³. This amendment emphasized reducing bycatch (harm to other marine life as a result of fishing), therefore monitoring bycatch became an important component of the observer program. The 2007 MSA Reauthorization expanded previous objectives and emphasized four main areas: 1) ending overfishing, 2) promoting market-based management, 3) expanding the role of science in management, and 4) enhancing international cooperation ³.

In addition to the MSA, the Marine Mammal Protection Act of 1972 (MMPA) and Endangered Species Act of 1973 (ESA) also provide legislative authority to the National Observer Program and observer data is also used for developing policy regarding endangered species, such as marine mammals, sea turtles, seabirds, and fish.

2.2 Observer Selection and Training

The NOAA Observer Program requires that observers have a natural sciences bachelor's degree, with at least 30 credits in biological sciences and one course in math or statistics. Some regional programs have additional requirements specific to that observer program. Independent companies that contract with regional observer programs are responsible for hiring observers; observers are not employed directly by NOAA. At the time of this writing, there are ten observer companies that employ NOAA Observers ¹⁷. These independent companies consult with regional Science Centers to understand their needs regarding observers and hire accordingly.

Primarily the regional offices, in coordination with observer provision companies and the Coast Guard, conduct observer training. The training, which takes between two to three weeks, has two major priorities: 1) training in data collection methods and procedures and 2) safety training. Observers are trained in emergency

preparedness, survival techniques in case of being thrown overboard, medical emergencies, and use of safety equipment, along with other specialized safety training ¹⁴. Observers are also trained extensively in data collection requirements to improve the reliability and validity of the data that they collect on-board. Training covers details concerning sampling technique and measurement, logging procedures, and expectations for the descriptions they are to record.

3 Existing Literature

3.1 Critiques of the Observer Program

Evaluating the Observer Program with Hawaiian longline fishers, Allen and Gough ^{1,2}, find that minority fishers expressed the most concerns. Specifically, the most common problems with the observer program among vessel owners, captains, and Hawaii-based crew were: lack of trust, inadequate reimbursement, decreased fishing efficiency, and safety issues. There was “dissatisfaction with the idea of the Observer Program itself, coupled with its implementation, rather than stemming from an on-board incident or particular observer” ². They find that fishers’ experiences with the observer program are shaped by factors such as ethnicity and that “consideration of fishermen’s perceptions, concerns, experiences, and ethnic-cultural backgrounds could prove useful in training observers to succeed in their own work while minimizing disruption of fishing operations and the lives of fishermen at sea” ².

Several examinations of observer programs have noted the need for consistent communication between scientists, political bodies, and fishers, as well as continuous evaluation of the quality of data produced by observers ^{4,18}.

Unfortunately, though cooperation between scientists and fishers is widely seen as imperative, this partnership must “overcome mistrust and suspicion, a lack of mutual understanding about each other's interests, misperceptions and negative attitudes, and poor communication” ¹⁹. Jones and colleagues ⁵ discuss the successful cooperative research strategy implemented in the Queensland Coral Reef Finfish Fishery. They note that a key component to the success of this project was the collaboration with fishers at all stages of the research and a dedicated liaison between fishers and researchers to support this collaboration ⁵. This cooperative approach also extends beyond commercial fisheries and includes recreational fisheries as well ⁶.

3.2 Alternative Monitoring Options

Currently, NOAA relies heavily on observers to provide valuable data that is used to make management and policy decisions, but alternative methods for data collection such as electronic monitoring, industry provision of data, and more localized management systems exist both within U.S. and international fisheries. This section briefly explores some of these alternative data collection methods to provide comparative context.

Recently, electronic monitoring has been more thoroughly explored as an alternative to observer programs. In most cases, the use of electronic monitoring is implemented through the installation of closed circuit television aboard vessels. This type of remote electronic monitoring (REM) has been studied thoroughly, but evaluations of its effectiveness are still mixed ^{7,8,20,21}. While REM has many benefits, such as lower cost than observers and more standardized data collection, it also poses obstacles such as the ability to cheat the REM system and the intrusiveness of the cameras on the vessel ⁸. Also, like many industries, the fishing industry, “including fishers, fishery management authorities, and other stakeholders, is, in many respects, highly resistant to change” ²². It is crucial that any new technology make practical sense aboard vessels and be implemented cooperatively ⁷.

Several studies have suggested that industry data – data provided by fishers or other members of the fishing industry themselves – may also be a viable alternative to or supplement to observer programs. Benoit and Allard ²³ estimate potentially significant inconsistencies in observer data due to non-random distribution of observers and bias from changed behavior during observation periods. They conclude with several recommendations for improving the validity and reliability of observer data through hybrid models in which observer data is combined with electronic monitoring and more extensive logbooks and industry reporting. They also build upon an observer deployment scheme proposed by Furlong and Martin ²⁴. Recognizing the high cost of observer programs, Furlong and Martin argue in favor

of placing observers specifically with vessels with a higher likelihood of violations. Furlong and Martin argue that this would most efficiently achieve a deterrent effect from observer programs, however Benoit and Allard ²³ raise the possibility that this placement strategy may threaten data quality and representativeness. Instead, Benoit and Allard argue for a combination of observer placement with violators, random placement of observers, electronic surveillance, and log books that together provide the most reliable and valid data.

Faunce ²⁵, in an evaluation of the Gulf of Alaska rockfish fishery data, found comparable species misidentification between observer data and industry provided data. In many landings, the data quality between observers and industry sources were comparable, however in one landing there was substantial misidentification by industry sources that resulted in delayed closing of a fishery. Faunce suggests a combination of larger observer sample sizes and increased industry logging to improve data quality. Gray and Kennelly ⁶ find that logbooks can serve as a credible source of data in recreational fisheries and that a collaborative model combining observer data and industry data could provide the most efficient and reliable data. Several studies of collaborative or co-management structures in fisheries management have also found that when industry members and researchers have high levels of trust and mutual respect, the data collected in collaboration with industry members is high quality ^{5,26-28}.

In addition to electronic monitoring, industry sources of data, and hybrid combinations of these and observer data collection, several international fisheries management policies involve a localized and smaller regional approach to fisheries management than that utilized in the U.S. under regional fisheries management councils and regional science centers ²⁹. While the U.S. does follow a regional model, countries such as the United Kingdom, France, Spain, and Denmark have much more localized fisheries management plans and policies that cover smaller geographical areas and fewer political subdivisions. Using a combination of qualitative and quantitative data collected by both observers and industry sources, the local management model develops more locally specific and appropriate approaches ²⁹. Previous research has demonstrated that this more localized approach to fisheries management is particularly well suited to areas where fishing communities vary dramatically and often include minority and immigrant communities ^{1,2,30}.

3.3 International Observer Programs

Fisheries observers are also utilized in a number of other nations and international fisheries commissions. For instance, the Indian Ocean Tuna Commission (IOTC) Regional Observer Program was developed to monitor and prevent the laundering of fish through at-sea transshipments activities ³¹ and the Azores Fisheries Observers Program (POPA) was formed as a way to protect dolphins from being killed while fishing for tuna ³². The Western and Central Pacific Fisheries Commission (WCPFC) Regional Observer Program (ROP) collects data from the

Western and Central Pacific Ocean³³ and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) Scheme of International Scientific Observation (SISO) requires all vessels to carry an observer for some or all of their fishing operations in Antarctica³⁴.

International observer programs also highlight the potential concerns with conflicts between observers and fishers that are the focus of this study. In particular, the Inter-American Tropical Tuna Commission (IATTC)³⁵ has struggled with conflicts between fishers and observers, and a resolution to reduce observer harassment was passed in 1999. This resolution resulted in policy reinforcement, incentives for vessels with positive observer experiences, and a working group on captain and observer relationships. Observer programs have been established as a key component on international and national fisheries management because of their ability to generate data for management policy and decisions but are susceptible to potential conflict and data quality concerns.

4 Methods and Data

Between 2014 and present, the lead author and colleagues have conducted focus groups with and surveyed Vietnamese American fishers in Louisiana, Mississippi, and Alabama, as well as interviewed staff at state and federal resource agencies and community organizations. Louisiana, Mississippi, and Alabama were selected for study due to the large number of Vietnamese American fishers in each state. All

research with human subjects was approved by the Institutional Review Boards at both ### University and ### University and adhered to principles of informed consent, voluntary participation, and confidentiality.

4.1 Focus Group Methods

Focus groups were conducted with fishers to ask about experiences with state and federal resource agencies, their relationships with those agencies, and their preferences for stakeholder engagement. Focus group participants were recruited through references from Sea Grant extension staff, local community organizations, and dockside recruitment with flyers. Food was provided at focus groups as an incentive and in appreciation for participation. Focus groups were conducted in both English and Vietnamese with student translators present to assist and lasted between 75 and 90 minutes. All focus groups were recorded and transcribed and translations were validated by having an additional translator listen to the recording and confirm the translation accuracy.

Focus group transcripts were coded using NVivo qualitative analysis software and iterative coding. The first round of coding identified major themes with subsequent rounds of coding further refining these broad themes into more focused subthemes. Coding was done by the first author and validated collaboratively amongst investigators and any disagreement over coding (inter-rater reliability) was resolved through discussion to achieve consensus.

4.2 Survey Methods

Surveys with fishers were collected to generate a larger and more representative data set regarding experience with agencies and stakeholder engagement. The survey was designed by investigators and tested by representatives from agencies, community groups, and other industry experts. The survey was pilot tested with Vietnamese American fishers in Mississippi at the Mississippi State University Coastal Research and Extension Center. Survey questions were translated into Vietnamese by Qualtrics research services and then translation was improved and validated by student translators and staff from community organizations. Surveys were administered on vessels or docks or in the offices of community organizations (discussed further below).

Surveys were administered face-to-face. Face-to-face surveys result in higher response rates overall and by question and are determined to be appropriate for older populations and those with low levels of literacy³⁶. Face-to-face surveys have been demonstrated to increase data validity and reliability by allowing for confirmation of questions and answers and reducing “satisficing”, or strategies that respondents use to minimize the cognitive burden of surveys such as skipping questions or straight-lining (selecting all of one answer category) ³⁶⁻⁴⁵. Face-to-face surveys also allow for the collection of additional observational data and informal conversational interviews to expand on the formal survey questions. Investigators

and translators draft field notes describing this additional contextual data at the conclusion of each survey trip.

Survey participants were recruited using a quota sample. Quota sampling involves dividing a target population into relevant subcategories and setting a target sample size (quota) for each subcategory³⁶. In this case, the target population was Vietnamese American fishers in Louisiana, Mississippi, and Alabama (including vessel owners, captains, deckhands, and other part-time labor) and the relevant subcategories were locations within those states. The Bureau of Labor census of fishery businesses was used to estimate the size of the target population in each location and the quota was set to reflect the relative size of the target population in each location: 150 in the Biloxi/Gulfport/Pascagoula/Pas Christian area; 150 in the Bayou la Batre area; 100 in the Abbeville/Franklin/New Iberia area; 50 in the Houma/Dulac/Port Fourchon area; and 50 in the Gretna/New Orleans/Buras area. At the time of writing, survey collection is ongoing and quotas have not been reached in the Bayou la Batre or Biloxi/Gulfport/Pascagoula/Pas Christian areas. Researchers have collected surveys from two hundred and seventy-eight fishers thus far.

Sampling bias is a limitation with non-random sampling techniques such as quota sampling. However, random sampling was not possible given the difficulty of obtaining an accurate and complete list of the target population required for random sampling. Investigators considered obtaining lists of fishing license holders

through public records requests to agencies, but this was determined infeasible given that fishers may hold licenses in several domains but not frequently dock their vessels in those areas, that addresses on licenses may correspond to personal homes and not vessel locations, and that there is no accurate and complete way to determine ethnicity from these lists. The target population also includes deckhands and other fishers who are not license holders. Therefore, quota sampling was determined to be most appropriate.

Investigators and translators visited docks, went vessel to vessel, and spoke to any individuals on vessels to inquire if they were of Vietnamese or Vietnamese American descent and if they would consent to the survey. The survey was conducted in either Vietnamese or English and took approximately fifteen minutes to complete. Responses were recorded on tablet computers and respondents were given a ten-dollar gas card as an incentive. To avoid potentially over-representing large vessels, if more than four people were working on a vessel, surveys were collected from a maximum of four people: one owner and/or captain and the three employees with the most seniority on the vessel.

4.3 Document Analysis

To evaluate the training offered to observers, publicly available training manuals ¹⁴ and reports from the 2013 national overview of NOAA's Observer Program ¹³ were evaluated and coded using NVivo qualitative analysis software. Manuals and reports were coded for any references to ethical behavior, cultural sensitivity, and/or

diversity. Training manuals were obtained from the National Observer Program website and regional office websites.

5 Findings

5.1 Current Training Manuals: Culture, Language, Diversity

Analysis of training manuals reveals that observers do receive some training regarding on-vessel behavior and expectations for trips ¹⁴. The training manual for the Southeast office includes eleven pages of “behavior” training within the two hundred and seventy-eight page manual. Three of these pages are “advice to women going to sea” that includes behavioral recommendations for women observers¹. Another two pages discuss illness and seasickness, before a brief discussion of observer behavior toward crew and facilities. Observers are cautioned to be considerate, to protect the confidentiality of the data collected, and advised about legal requirements for reporting and legal protections from harassment by crew. Observers are advised of the ethical code that prohibits things such as alcohol or drug consumption during a trip or the acceptance of gifts from crew members.

Notably absent from training materials, particularly given the large proportion of Vietnamese American fishers in the Southeast region, is mention of cultural

¹ This is not the focus of this study, but the language in this section of the training manual is highly problematic, focused almost exclusively on the responsibility of women observers to prevent their own sexual assault and harassment.

consideration, language barriers, or other considerations for the likely situation in which observer, captain, and crew may be of different ethnicities, cultures, or language background. There is no mention of what to do if a language barrier exists between captain and/or crew and observer, particularly in emergencies or when communication is an essential part of data collection (as with data that must be collected from the captain or crew). Likewise, there is no discussion of diversity amongst crew and observers and how observers may engage with crew in a culturally considerate manner.

The only portion of the training manual that explicitly addresses culture or diversity amongst the crew is the “Advice to women” portion, which does acknowledge that “staffing on a ship brings together people with very diverse backgrounds and value systems” and that “The crew of the ship has usually established a workable interaction among themselves, while scientists, who come aboard for a single cruise, are not part of that system”¹⁴. However, these comments are framed only to women observers and only as the diversity might relate to their potential harassment by crew members.

No other observer training manual provides guidance on potential language barriers, cultural sensitivity, or other concerns regarding diverse fishing populations. One small exception is the Northeast Observer Program manual that does mention that “fishing jargon and foreign language inhibit communication”⁴⁶. The West Coast Groundfish Observer Program does make mention of the need to

discuss “special dietary needs” in advance with the captain, although not directly discussing cultural food diversity ⁴⁷.

5.2 Overall Survey Results

Amongst survey respondents, seventy-two fishers (37% of respondents) have had observers on their vessel or a vessel on which they have worked: fifteen in Alabama, forty-two in Louisiana, and sixteen in Mississippi.

<FIGURE 1 ABOUT HERE>

The largest proportion of respondents (~42%) indicated that they were “very satisfied” with the overall experience of having an observer on their vessel (see Figure 1). Approximately 24% of respondents indicated that they were dissatisfied with the payment received for having an observer on their vessel (see Figure 1).

5.3 Language Barriers

A language barrier between fishers and observers was cited as the most common difficulty in hosting an observer in both surveys and focus groups. While many owners and captains speak English well, many deckhands do not. Amongst survey respondents, language was selected as the most common single challenge faced for hosting an observer (see Figure 1) with approximately 39% reporting that language

was a challenge. During informal conversations, fishers expanded upon language as an important concern. Fishers worried that this language barrier contributed to tensions as well as to safety concerns.

During focus groups, fishers also emphasized language barriers with observers as a challenge. One fisher said, “none of them is not (sic) a really good relationship yet {with observers}. Simply because of language access.” During another focus group, a coordinator asked: “What keeps you from communicating with {observers} the most?” and the fisher responded frankly: “Language.” Another said that even though he, a captain and owner, spoke English, the rest of the crew did not: “their deckhand was not competent to speak English.” Participants reported frustration with an inability to pass important information between observer and crew and sensed that the language barrier also frustrated observers.

5.4 Cultural Barriers

During focus groups, fishers also spoke about cramped quarters and pragmatic issues raised by having an extra person on the vessel who was not contributing to their livelihood as well as someone who was a cultural “outsider.” Even when observers were considerate, respondents shared, it was awkward to have a stranger on the vessel, who didn’t speak the same language, and who they perceived did not have much knowledge of Vietnamese American culture. Food was a repeated

example offered by fishers of the “cultural gap” between themselves and observers. Fishers shared that observers often did not care to eat the same food as themselves and the crew, mentioning this food differentiation as an example of cultural differences between themselves and observers.

During a focus group, one fisher said: “Instead of bringing their own food, you have to supply the food for {observers}. At the end of the day, they did not eat Vietnamese food, so you had to supply them a certain food for them specifically...” The separate food served as both an added cost and a symbol of cultural difference.

Fishers also discussed the difficulties of hosting a woman observer during focus groups and surveys. Amongst survey respondents, “gender, the observer was a woman” was the second-most common problem (see Figure 1), reported by 23% of respondents who had hosted an observer. During a focus group, one fisher who had hosted a woman observer expressed to the translator:

“Not that they’re prejudiced against women or anything like that, but it is kind of uncomfortable. You’ve got four men and a woman unrelated to you walking around your boat. You know, it makes things uncomfortable...Their superstitions, the Vietnamese anyways, is that women should not be on board boats. And so, for some it may be a discomfort because ... for those that do have that superstition, that’s embedded in their culture that the women do not go on board boats.”

Fishers discussed both pragmatic privacy concerns in hosting a woman observer and cultural tensions. Providing adequate privacy for a woman observer can be challenging. Often, to provide private sleeping quarters for the observer she is offered the captain’s quarters. But fishers discussed how this then forces captains

and owners to bunk with deckhands, which challenged their workplace hierarchies resulting in discomfort for both captains and deckhands. However, similar gender issues may also be present for non-Vietnamese American fishers hosting women observers.

5.5 Non-Vietnamese American Specific Complaints

These concerns specific to Vietnamese American fishers hosting observers combine with other concerns that go beyond racial and ethnic minority fishers. Other complaints included issues such as the low rate of reimbursement for hosting observers, feeling coerced into participation, and disruption to fishing routine. These complaints are likely not unique to Vietnamese American fishers but may exacerbate frustration with the observer program.

6 Discussion

This study has reviewed the NOAA Observer Program as it relates to Vietnamese American fishers in the Southeast U.S. region. It has examined relevant policies and literature and offered analysis of relevant training materials and independent data gathered from focus groups and surveys in Louisiana, Mississippi, and Alabama. Findings show that: 1) there is currently virtually no explicit diversity or foreign language training for observers and that 2) Vietnamese American fishers in the area

have experienced a number of difficulties with NOAA's Observer Program, specifically concerns about language barriers with observers and cultural differences with observers regarding food and gender norms. These concerns combine with tensions regarding payment, involuntary participation, and disruption to routine that are not unique to Vietnamese American fishers. Evaluation of training materials confirms the absence of observer training focused on cultural sensitivity, language, or ethnic diversity in fishing communities.

Our findings confirm those of Allen and Gough ^{1,2} that fishers from racial and ethnic minorities face struggles with NOAA's Observer Program and extend the analysis of Allen and Gough to a different region, fishery, and community of stakeholders. As Allen and Gough conclude in their examination of Hawaii's Observer Program, these struggles may serve to undermine the successful operation of NOAA's Observer Program in the Southeast region. Specifically, it is likely that these challenges make fishers less willing to host observers and less compliant when hosting. This potentially undermines the quality of observer data collection. Several studies have demonstrated that baseline trust and communication amongst observers and fishers supports more valid and reliable data collection ^{2,4,6,7,18}. NOAA's Observer Program provides foundational data that is used to inform both short-term and long-term management decisions, and language or cultural barriers between fishers and observers may threaten that data collection.

In addition to potentially undermining the validity and reliability of observer data, tensions between observers and fishers may lead to increased workplace stress and safety concerns for observers. Again, this confirms findings of Allen and Gough ^{1,2} that safety for both crew and observers is a heightened concern when observers are placed with racial and ethnic minority fishers. Indeed, several recent cases have highlighted challenges of current programs and training for observers themselves. These cases suggest that observers face many concerns related to their work and data collection that may be exacerbated by the issues highlighted in this study. In 2011, a complaint filed jointly by the Association for Professional Observers and Public Employees for Environmental Responsibility against the Southeast Observer Program highlighted observer complaints regarding training, safety, and workplace conditions ⁴⁸. The complaint alleges that NMFS staff pressured observers to not report violations observed on vessels and to accept assignments on unsafe vessels or in unsafe conditions, and that observers experienced workplace retaliation if they resisted. These complaints resulted in a nationwide review of the National Observer Program that is still ongoing at the time of publication. According to the complaint filed, observers filed one hundred and twenty-five formal reports of harassment, intimidation, or assault between 2007 and 2011 ⁴⁹. These reports suggest that observers work in a highly stressful and potentially unsafe environment and that additional barriers such as language or cultural distinction may intensify their workplace hardships.

Based on the findings of this study, it is recommended that NOAA's observer training, at minimum, incorporate discussion of diversity of fishing communities and cultural sensitivity into training. It is also recommended that training include discussion of the variety of languages that may be encountered on vessels and that basic phrasebooks including relevant safety, workplace, and conversational phrases are provided for observers. Observers should be prepared for the diverse individuals they may encounter on vessels and be able to communicate when needed. This training would improve the reliability and validity of data collection, increase the safety of observers, and improve their workplace experience. It would also improve the experience of diverse captains and crews, which would improve the overall functioning of the observer program and likely reduce conflicts between observers and crew and support involvement of Vietnamese American fishers in management in the region.

American fishers are culturally and ethnically diverse, as are NOAA Observers. Our findings demonstrate that Vietnamese American fishers in the Southeast region face significant obstacles to the successful enactment of the NOAA Observer Program, specifically language and cultural barriers.

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References

1. Allen, S. D. & Gough, A. Monitoring Environmental Justice Impacts: Vietnamese-American Longline Fishermen Adapt to the Hawaii Swordfish Fishery Closure. *Human Organization* **65**, 319–328 (2006).
2. Allen, S. D. & Gough, A. *Hawaii Longline Fishermen's Experiences with the Observer Program*. (NOAA National Marine Fisheries Service, 2007).
3. Brooke, S. G. Federal Fisheries Observer Programs in the United States: Over 40 Years of Independent Data Collection. *Marine Fisheries Review* **76**, 1–38 (2014).
4. Cotter, A. J. R. & Pilling, G. M. Landings, logbooks and observer surveys: improving the protocols for sampling commercial fisheries. *Fish and Fisheries* **8**, 123–152 (2007).
5. Jones, A., Slade, S., Williams, A., Mapstone, B. & Kane, K. Pitfalls and Benefits of Involving Industry in Fisheries Research: a case study of the live reef fish industry in Queensland, Australia. *Ocean and Coastal Management* **50**, 428–442 (2007).
6. Gray, C. A. & Kennelly, S. J. Evaluation of observer- and industry-based catch data in a recreational charter fishery. *Fish Manag Ecol* **24**, 126–138 (2017).
7. Mangi, S. C., Dolder, P. J., Catchpole, T. L., Rodmell, D. & de Rozarieux, N. Approaches to fully documented fisheries: practical issues and stakeholder perceptions. *Fish Fish* **16**, 426–452 (2015).
8. Plet-Hansen, K. S. *et al.* Remote electronic monitoring and the landing obligation – some insights into fishers' and fishery inspectors' opinions. *Marine Policy* **76**, 98–106 (2017).

9. Campi, A. From Refugees to Americans: Thirty Years of Vietnamese Immigration to the United States. *Vietnamese and American Veterans of the Vietnam War* (2005). Available at: <http://www.vietamericanvets.com/page-diaspora-fromrefugeestoamericans.pdf>. (Accessed: 29th August 2014)
10. Dang, M. T. What comes next?: employment opportunities for Vietnamese American fisherfolk affected by the BP gulf oil spill in Louisiana. (Massachusetts Institute of Technology, 2011).
11. Alabama Marine Resources Division. Interview with Alabama Marine Resources Division. (2012).
12. NOAA Fisheries. NOAA's National Observer Program: Fact Sheet. (2017). Available at: http://www.st.nmfs.noaa.gov/Assets/Observer-Program/pdf/NOPFact%20Sheet_finaldraft.pdf. (Accessed: 22nd August 2017)
13. National Observer Program and Advisory Team. National Review of Observer Program Policies and Procedures with Recommendations with Respect to the 2013 Administrative Inquiry Action Items. (2014). Available at: https://www.st.nmfs.noaa.gov/Assets/Observer-Program/pdf/Report_on_Obs_Prgm_Policies_Procedures_28Mar14_Final_rev2.pdf. (Accessed: 29th August 2017)
14. Southeast Fisheries Science Center. Observer Training Manual: Characterization of the US Gulf of Mexico and Southeastern Atlantic Otter Travel and Bottom Reef Fish Fisheries. (2017). Available at: http://www.galvestonlab.sefsc.noaa.gov/forms/observer/obs_training_manual_5_2016.pdf. (Accessed: 29th August 2017)

15. NOAA Fisheries. Map: National Observer Program. *Observer-sub level* (2017).
Available at: <https://ST/observer-home/programs/map/index>. (Accessed: 29th August 2017)
16. Dell’Apa, A., Schiavinato, L. & Rulifson, R. A. The Magnuson–Stevens act (1976) and its reauthorizations: Failure or success for the implementation of fishery sustainability and management in the US? *Marine Policy* **36**, 673–680 (2012).
17. NOAA Fisheries. Observer Employers. *National Observer Program* (2017).
Available at: <https://www.st.nmfs.noaa.gov/observer-home/observerresources/observeremployers/index>. (Accessed: 21st December 2017)
18. Crosson, S. The Impact of Empowering Scientific Advisory Committees to Constrain Catch Limits in U.S. Fisheries. *Science and Public Policy* **40**, 261–273 (2013).
19. Hartley, T. & Robertson, R. A. Cooperative Research Program Goals in New England: Perceptions of Active Fishermen. *Fisheries* **33**, 551–559 (2008).
20. Ruiz, J. *et al.* Electronic monitoring trials on in the tropical tuna purse-seine fishery. *ICES J Mar Sci* **72**, 1201–1213 (2015).
21. Stanley, R. D., McElderry, H., Mawani, T. & Koolman, J. The advantages of an audit over a census approach to the review of video imagery in fishery monitoring. *ICES J Mar Sci* **68**, 1621–1627 (2011).
22. Eayrs, S., Cadrin, S. X. & Glass, C. W. Managing change in fisheries: a missing key to fishery-dependent data collection? *ICES J Mar Sci* **72**, 1152–1158 (2015).

23. Benoit, H. P. & Allard, J. Can the data from at-sea observer surveys be used to make general inferences about catch composition and discards? *Canadian Journal of Fisheries and Aquatic Sciences* **66**, 2025–2039 (2009).
24. Furlong, W. J. & Martin, P. M. Observer deployment in the fishery and regulatory self-enforcement. in *Proceedings of the 10th Biennial Conference of the International Institute of Fisheries Economics and Trade* (2000).
25. Faunce, C. H. A comparison between industry and observer catch compositions within the Gulf of Alaska rockfish fishery. *ICES Journal of Marine Science* **68**, 1769–1777 (2011).
26. Ovando, D. A. *et al.* Conservation incentives and collective choices in cooperative fisheries. *Marine Policy* **37**, 132–140 (2013).
27. Satria, A. & Matsuda, Y. Decentralization of fisheries management in Indonesia. *Marine Policy* **28**, 437–450 (2004).
28. Scholz, A. *et al.* Participatory socioeconomic analysis: drawing on fishermen's knowledge for marine protected area planning in California. *Marine Policy* **28**, 335–349 (2004).
29. Mardle, S. *et al.* Objectives of fisheries management: case studies from the UK, France, Spain, and Denmark. *Marine Policy* **26**, 415–428 (2002).
30. Clay, P. M. & Olson, J. Defining 'Fishing Communities': Vulnerability and the Magnuson-Stevens Fishery Conservation and Management Act. *Human Ecology Review* **15**, 143–160 (2008).
31. Indian Ocean Tuna Commission. Conservation and Management Measures. (2018). Available at: <http://www.iotc.org/cmms>. (Accessed: 4th January 2018)

32. Programa de Observacao para as Pescas dos Acores. POPA - Programa de Observação para as Pescas dos Açores. (2018). Available at: http://www.horta.uac.pt/projectos/popa/popa_EN.htm. (Accessed: 4th January 2018)
33. Western & Central Pacific Fisheries Commission. Western & Central Pacific Fisheries Commission. (2018). Available at: <https://www.wcpfc.int/>. (Accessed: 4th January 2018)
34. Commission for the Conservation of Antarctic Marine Living Resources. Commission for the Conservation of Antarcti Marine Living Resources. (2018). Available at: <https://www.ccamlr.org/>. (Accessed: 4th January 2018)
35. Inter-American Tropical Tuna Commission. Inter-American Tropical Tuna Commission. (2018). Available at: <https://www.iattc.org/HomeENG.htm>. (Accessed: 4th January 2018)
36. Babbie, E. R. *The Practice of Social Research*. (Cengage Learning, 2015).
37. Schaeffer, N. C. & Presser, S. The Science of Asking Questions. <http://dx.doi.org/10.1146/annurev.soc.29.110702.110112> (2003). Available at: <http://www.annualreviews.org/eprint/rU4UOoizjrXROhijkRIS/full/10.1146/annurev.soc.29.110702.110112>. (Accessed: 3rd January 2017)
38. Vannette, D. L. & Krosnick, J. A. A comparison of Survey Satisficing and Mindlessness. *The Willey Blackwell Handbook of Mindfulness* **312**, (2014).
39. Krosnick, J. A., Narayan, S. & Smith, W. R. Satisficing in surveys: Initial evidence. *New directions for evaluation* **1996**, 29–44 (1996).

40. Holbrook, A. L., Green, M. C. & Krosnick, J. A. Telephone versus face-to-face interviewing of national probability samples with long questionnaires: Comparisons of respondent satisficing and social desirability response bias. *Public opinion quarterly* **67**, 79–125 (2003).
41. Hamby, T. & Taylor, W. Survey satisficing inflates reliability and validity measures: An experimental comparison of college and Amazon Mechanical Turk samples. *Educational and Psychological Measurement* **76**, 912–932 (2016).
42. Jordan, B. Validity and the collaborative construction of meaning in face-to-face surveys. *Questions about questions: Inquiries into the cognitive bases of surveys* 241 (1992).
43. Krysan, M., Schuman, H., Scott, L. J. & Beatty, P. Response rates and response content in mail versus face-to-face surveys. *Public Opinion Quarterly* **58**, 381–399 (1994).
44. Hox, J. J. & De Leeuw, E. D. A comparison of nonresponse in mail, telephone, and face-to-face surveys. *Quality and Quantity* **28**, 329–344 (1994).
45. Dillman, D. A. Presidential Address: Navigating the Rapids of Change: Some Observations on Survey Methodology in the Early Twenty-First Century. *Public Opin Q* **66**, 473–494 (2002).
46. Northeast Fisheries Science Center. Fisheries Sampling Branch Observer Operations Manual. (2016). Available at: https://www.nefsc.noaa.gov/fsb/manuals/2016/Operations_Manual.pdf. (Accessed: 4th December 2017)

47. Northwest Fisheries Science Center. *2017 Training Manual: West Coast Groundfish Observer Program*. (National Marine Fisheries Service, 2017).
48. Association of Professional Observers & Public Employees for Environmental Responsibility. National Marine Fisheries Service (NMFS) Southeast Observer Programs – Region-wide Mismanagement and Illegal Activities. (2011). Available at: http://www.apo-observers.org/docs/APO_PEER_Complaint.pdf. (Accessed: 22nd November 2017)
49. Association of Professional Observers & Public Employees for Environmental Responsibility. Appendix 5: All complaints of observer mistreatment, nationwide, reported to NMFS since January 1, 2008, to present, and any associated reports presenting findings and resultant actions. (2011). Available at: http://www.apo-observers.org/docs/4_Appendix_5_Observer_Harassment_Cases_1.pdf. (Accessed: 22nd November 2017)

Figure 1: Survey Results

