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Monitoring Environmental Justice Impacts: Vietnamese-American Longline Fishermen Adapt to the Hawaii Swordfish Fishery Closure

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The Hawaii-based longline fishery, which lands the vast majority of the Hawaii commercial catch of pelagic fish, is a limited entry fishery capped at 164 permits. Of the 120 active vessels, roughly 1/3 are owned by Vietnamese-Americans. Since the late 1980s, nearly all of the Vietnamese-American longline fishermen targeted swordfish. This changed dramatically in 2001 when the National Marine Fisheries Service prohibited targeting of swordfish due to interactions with threatened and endangered sea turtles. The final environmental impact statement predicted that the closure and related actions would disproportionately and negatively affect Vietnamese-American fishermen. To monitor actual social impacts, researchers conducted in-depth interviews with 40 Vietnamese-American owners, captains, and wives from June - November 2003. Changes in household income, family cohesion, and community cohesion, coupled with the cumulative impact from other actions, created a dramatic change in the quality of life of affected individuals and families, with effects rippling through the Vietnamese-American fishing community and the broader longline community. The impact assessment had identified some types of impacts, but missed substantial components of others, demonstrating the necessity of monitoring social impacts.

Key words: Hawaii longline fleet, social impact assessment, impacts of fishing regulations, environmental justice, Vietnamese-American fishermen

Introduction

This article describes the range of social and cultural impacts incurred by Vietnamese-American fishermen, households, and the associated community involved in the Hawaii-based longline fishery as a result of the 2001 prohibition on swordfishing. The Hawaii-based longline fishery, which lands the vast majority of the Hawaii pelagic commercial catch, has been a limited entry fishery since 1994, with a cap of 164 vessels. Of the 120 vessels active in 2001, about 40 were Vietnamese-American operated. Since the late 1980s, nearly all of the Vietnamese-American longline fishermen targeted swordfish, the largest component of the longline catch in 2000. This situation changed dramatically due to court-ordered regulations resulting from a 1999 suit against the National Marine Fisheries Service. The suit charged that the longline industry's incidental catch (take) of threatened and endangered sea turtles posed a threat to the survival of

Pacific populations of these protected species, particularly leatherback and loggerhead turtles. Further, plaintiffs charged that NMFS erred in not preparing an environmental impact statement prior to issuing its 1998 Biological Opinion and Incidental Take Statement for sea turtles.

A final environmental impact statement (FEIS) for pelagic fisheries published March 30, 2001 (and implemented in 2002) contained measures that closed the Hawaii-based longline swordfish fishery, including a prohibition on using longline gear to target swordfish north of the equator (the southern limit of the fishing operations by the Hawaii-based longline fleet), prohibition on possession of light sticks (commonly used to attract swordfish during night sets), and a prohibition on possessing or landing more than 10 swordfish on any fishing trip (National Marine Fisheries Service 2001). The regulations also essentially ended the ability of Hawaii-based longliners to fish out of both Hawaii and California, due to new registration requirements.

The FEIS predicted that the closure and related actions would disproportionately and negatively affect Vietnamese-American fishermen, posing environmental justice issues. President Clinton's Executive Order 12898 (issued Feb. 11, 1994; amended 1995) addressed environmental justice issues: "Each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health

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or environmental effects of its programs, policies, and activities on minority populations and low income populations."

The FEIS described the effects on vessel owners as "immediate and substantial", as well as imposing "severe economic hardship" on crew members of Vietnamese-American descent. FEIS economic analyses predicted substantial declines in the number of vessels that would break even, fishery gross revenues, direct payments to labor, purchases from local suppliers, and total economic impact. The magnitude of effects was lower for a scenario assuming all vessels would not switch from swordfish or mixed swordfish trips to tuna trips compared to a scenario assuming that all swordfish vessels were converted to begin tuna fishing. In fact, a mix of these scenarios occurred; following the ban on targeting of swordfish, about 40 percent of the Vietnamese-owned vessels were relocated to California, where swordfishing was still allowed, while 60 percent remained in Hawaii and converted to tuna fishing. The FEIS suggested that effects on owners could be mitigated by a permit or vessel buy-back program (which was not developed).

Due to a lack of data specific to longline fishermen, the FEIS cited a study of workers laid off from the sugar industry on the island of Hawaii to describe the range of possible effects, including sustained unemployment and loss of income and resulting social and psychological impacts. These included heightened feelings of anxiety, depression, illness, and increased problems in relationships among laid-off employees and family members.

Additional study was clearly needed to better understand the interrelationships among economic, social, and cultural impacts to Vietnamese-American fishermen. This paper does not attempt to fully assess and document all of the human impacts of the swordfish closure. Instead, the purpose is to explore the range of effects as reported by a sample of Vietnamese-American fishermen and their families. This information will provide fisheries managers and social researchers with a better understanding of the types and ranges of psychological, social, and cultural effects among Vietnamese-American and other populations. The findings also can be used to aid future social impact assessment efforts.

Literature Review

Fishing regulations can affect the well-being of fishermen and their families in many ways, from decreased levels of job satisfaction (Gatewood and McCay 1990; Pollnac and Poggie 1988) to psychological effects such as increased levels of depression, family stress, anxiety, and other mental health indicators (Smith et al. 2003). Negative impacts can also be compounded by cumulative impacts from other regulations and broader social changes occurring in many communities formerly strongly associated with fishing.

Impacts also can affect the well-being of communities, whether community is defined as a place (village or town) or a group of people linked together socially or culturally. For example, social and cultural impacts resulting from enactment

of groundfish regulations in New England included avoidance of community ritual celebrations and declining participation rates in a local fishing association (Dyer and Poggie 2000). Regulatory actions significant enough to affect the viability of an industry can be difficult to mitigate through buy-back or retraining programs because natural resource workers can have attachments both to place and to their occupation; workers cannot simply be retrained or relocated without hardship (Carroll et al. 2000, Dyer and Poggie 2000).

It is also important to consider the dynamic nature of social impacts; people and social institutions typically formulate responses to fishing regulations and other stimuli in an attempt to successfully adapt and continue to meet their goals (Endter-Wada and Keenan 2005). A useful concept to consider is resiliency, defined here as the ability to successfully adapt to change (Harris, Brown, and McLaughlin 1996). The concept is similar to (although the antithesis of) vulnerability, which has been used to characterize fishing communities' ability to adapt to fishing regulations (Wilson and McCay 1998; McCay and Cieri 2000).

Resiliency can be assessed at many scales, including the individual, family or household, and community. For example, how household members as a group will be affected by a change in fishing regulations can depend on how many wage earners are present, the proportion of household income that would be lost, the household's ability to secure other sources of income, and the household's cultural attachments to the lost or altered fishing opportunity. Based on these and related characteristics, some affected households may be more resilient than others, and therefore better able to maintain their quality of life (Hanna and Hall-Arber 2000). At the broader community scale, the level and nature of social cohesion, reflected by the ability of a community to work together to accomplish desired goals, is a factor contributing to resiliency (McCool, Burchfield, and Allen 1997). As noted by Acheson (1988), "survival in the industry depends as much on the ability to manipulate social relationships as on technical skills" (p. 2). Wilson and McCay (1998), studying the Gulf of Mexico yellowfin tuna and shark fleet, described the Vietnamese community as relying on tight kinship networks for both fishing activity and fish buying. Strong social cohesion, if present, could be a source of resiliency for the Vietnamese-Americans, reflecting as a network of hope as well as a group of expert fishermen who could pool their resources to learn new techniques or otherwise adapt to the changed regulatory environment.

To lay the groundwork for the proposed study, we conducted 20 interviews with Vietnamese-American owners, wives, and family members. The interviews were conducted in-person between November 2002 - January 2003. Potential interviewees were identified through a sequential sampling process, beginning with one contact widely known within the Vietnamese-American fishing community. We asked this individual, and each subsequent person interviewed, to recommend others we could talk to in order to learn more about the effects of the swordfish closure.

The initial drop in income reported by nearly all families was related to a web of psychological, family impacts, and community impacts. Psychological impacts included symptoms of depression, anxiety, and changes in mood, related not only to income loss but to a significant change in one's lifestyle and ability to make a living in a desired place and vocation. Family impacts included disruption of normal patterns of behavior, such as longer times apart from other family members, and a variety of impacts to children. Community impacts included a change in the nature of community interactions and in the ability and willingness to undertake collective action.

The following sections describe our methods and explain results at the individual, family and community levels of analysis, closing with some recommendations for management and future research and an epilogue describing recent events in the swordfish fishery.

Methods

The data set consisted of notes from 40 oral histories conducted between June - November 2003, primarily with Vietnamese-American longline vessel owners, captains, and crew, although eight of the wives and owners contacted in the pre-test were re-interviewed to obtain additional information. This set of oral histories, conducted as part of a more in-depth socio-cultural study of the entire Hawaii-based longline industry, covered far more topics than the pre-test, and in greater detail. Only that portion relevant to impacts of the swordfish fishery closure is discussed in this paper.

The 40 individuals were chosen to represent a broad cross-section of the Vietnamese-American sector of the longline fleet. Sampling began with a core of well-known fishermen and progressed on an opportunistic basis until all Hawaii-based vessels were represented by at least one individual. As the California vessels returned or their owners became available, they were included as well. The interviewees represented all of the Vietnamese-American longline vessels that remained in Hawaii, along with 9 of the vessels that relocated to California.

Of the 40 individuals, 22 were owners, 6 were captains, and 12 were crew members. Many of the results are presented separately for each of these three groups. The group of owners included individuals who owned one or more vessels, some of whom also served as captain when the vessel was at sea. The owners group also included seven wives of owners, who were typically heavily involved in helping manage the fishing business. The group of captains includes only those who had no ownership role; these individuals served as captain on one or more boats, responsible for the vessel when at sea. The crew included several who had served as captain on one or more trips, as well as two ex-crew members no longer in the industry.

All oral histories were conducted with the assistance of the same interpreter. Although some of the interviewees spoke English quite well, they could communicate some sentiments

more effectively in Vietnamese. The interpreter hired for the project also served as a community liaison; as a peripheral member of the fishing community, she provided some contacts unmentioned by others. Her presence and interest in the fishermen helped to create a more comfortable atmosphere even when interviews did not require interpretation.

Results

The ban was a precipitous event to all of those interviewed. When asked about the major obstacle they had faced in the longline industry, 100 percent of the owners and captains and 80 percent of the crew specified the swordfish fishery closure. The Vietnamese-Americans had moved to Hawaii, a highly desirable location, to specialize in a very lucrative fishery that was suddenly unavailable.

There are many ways to categorize the types of impacts described by the fishermen; the categories of effects and their causes are a complex web of social and economic factors. The following sections describe income, psychological well-being, family cohesion, community cohesion, and cumulative impacts. The categories chosen overlap each other to a large extent but nonetheless show the ranges and types of effects and their interrelationships. First, we will describe some key characteristics of the sample.

Characteristics of the Vietnamese-Americans Interviewed

Owners, captains and crew differed in a number of respects (Table 1). Owners tended to be older than captains, who were older than crew members. Years of commercial fishing experience and years in the Hawaii longline fleet paralleled age, although all three groups had worked in Hawaii for a nearly a decade or more. A majority of all three groups came from fishing families, although the proportion was higher among owners and captains.

The large proportion of owners and captains who had worked in three or more other fisheries reflected an attachment to the fishing lifestyle. Most owners and half of the captains had worked in the Gulf shrimp and/or longline fleet before coming to Hawaii. Crew members were more likely to have fished in the Gulf longline fleet than in the shrimp fleet. Many had held other jobs, such as serving in the military when they still lived in Vietnam or a variety of trades and service sector jobs on the U.S. mainland such as meat cutter, factory worker, mechanic, construction worker, yard care worker, welder, janitor, seamstress, electrician, repairman, and cook.

The owners were least apt to be fluent in English, although most could converse somewhat successfully. About three-quarters of each group had not graduated from high school. Considering this level of education, their limited non-fishing work experience, and lack of fluent English, many fishermen would not be expected to be resilient with respect to occupation, increasing their dependence on fishing.

Table 1. Characteristics of Vietnamese-Americans Interviewed

Characteristic	Owners ¹ (n = 21)	Captains (n = 6)	Crew (n = 12)
Age (mean)	49	43	39
Years commercial fishing experience (mean)	20	18	12
Years in Hawaii longline (mean)	13	12	9
Percent who worked in 3 or more other fisheries	57%	67%	25%
Percent who fished in Gulf shrimp	67%	50%	8%
Percent who worked in Gulf longline	67%	50%	42%
Percent who came from a fishing family	79%	83%	58%
Percent not fluent in English	90%	83%	75%
Percent not graduating from high school	74%	75%	80%
Percent currently married	86%	83%	71%
Number of children (mean)	3.3	1.7	1.6
Percent with 4 or more children	45%	0%	12%

¹The owners group includes responses from 21 individuals rather than 22; one owner and wife were interviewed so the responses of one were omitted to avoid double-counting on many of the family and household variables. We had much more information from the husband, so we omitted responses of the wife in the tables.

Most were currently married and had children; the owners had the largest families, and nearly half had four or more children. Nearly half of the owners described their religion as Buddhist, and about one-third as Catholic. These religions were the two most frequently mentioned by captains and crew as well.

Like hundreds of thousands of refugees from Vietnam who resettled in the United States after the end of the Vietnam War in 1975, many of the fishermen came to the U.S. via refugee camps, having experienced cultural upheaval and separation from their families. For many the transition was difficult, but may have led to increased resiliency as a result of the tremendous adaptations required.

Impacts to Income

Swordfishing was a lucrative business. We did not measure household income before and after the closure of the swordfish fishery or quantitatively assess other economic impacts, but it was clear that decreased income was a major concern. Two-thirds of the owners and a higher proportion of captains described their current level of income as very much a problem (Table 2). However, just 15 percent of the owners, 22 percent of crew, and none of the captains reported making a reasonable income from fishing in the past year, and most said their income had decreased from the previous year. When asked about their family's financial dependence on the longline industry, 67 percent of the owners and crew and 83 percent of the captains said that longline fishing provided all of their family's income.

One family that owned two boats said before the ban they were making about \$800,000-\$900,000 annually, compared to \$300,000 after the ban. Another family reported their profits were halved, while another reported a 75 percent drop in income. One wife reported being shocked when the ban was announced and wanting to give up, but couldn't because of their debts; they still owed \$200,000 on a boat they had built right before the ban. She said she felt as if she had been holding a bowl of rice and the government snatched it away. One extremely difficult interview during the pre-test was curtailed because the family was in the process of filing for bankruptcy. Crew members also reported diminished income; one said that before the ban he made \$30,000 - \$40,000 a year, and now it was about half that. Another said he used to make \$5,000 - \$7,000 per trip, but following the ban he made just several hundred dollars per trip. One captain said his income on the last trip was no more than the crew's.

Compared to captains and crew, owners were likely less resilient financially because of the large investment they had made in vessels and equipment and associated expenses such as maintenance. Many owners were still making payments on their longline boats and gear. Some had all of their skills and money tied up in the swordfish boat and were preoccupied with the threat of repossession. Many of the Vietnamese-American longline vessels have joint ownerships; changes in vessel ownership patterns emerged following the ban as part-time owners dropped out of the business.

When asked if they were currently breaking even or not, 68 percent of the owners said they were losing money, 19 percent reported breaking even, and 14 percent reported making

Table 2. Ratings of Income

Rating	Owners (n = 21)	Captains (n = 6)	Crew (n = 12)
Percent who said current level of income is very much a problem	67	83	58
Percent who said they made a reasonable income over the last year	15	0	22
Percent who said their income is lower than last year's	81	83	67
Percent who said longline provided 100% of family income	67	83	67
Percent who said that fishing is a way to make money only and not meet other needs	25	67	33
Percent who said they would quit fishing if they could make more money at another job	26	50	50

a profit. Longline vessel owners reported having many fixed costs such as docking, insurance, and regular maintenance regardless of how frequently they fished. One owner, for example, said it cost him \$1,200 per month to upkeep his boat if it was out on the water and \$1,100 per month if docked, given recent increases in dock fees. Some owners reported deferring maintenance on boats, which not only meant that their major investment was diminishing over time but that safety could be compromised while at sea.

One family said they were now unable to dry dock their boats and could afford to make only the most urgently needed repairs, and worried about their vessel losing value due to its deteriorating condition. Crew and owners alike believed there would be less work available for maintenance workers. In fact, one of the Vietnamese-owned vessels sank at sea late in 2004; crew had long complained of the vessel's condition and need for maintenance.

The Vietnamese reported operational impacts regardless of whether they kept their vessels in Hawaii or relocated to California. Swordfish vessel owners who kept their boats in Honolulu and converted them for tuna fishing did receive \$32,000 each through a federal economic assistance program. However, this amount was based on the estimated cost of the gear needed to fish for tuna, and did not cover labor costs to install the gear. Another problem was the timing of the payments; the funds may not have arrived before fishermen converted their boats, so the conversion added to the fishermen's overall debt. When they received the funds, the owners sometimes had more pressing financial needs, so the increased debt remained. The economic assistance program offered to vessel owners did not benefit Vietnamese-American captains or crew members.

After converting the vessel in preparation for tuna fishing, the owners had to purchase other equipment and, more importantly, learn a new style of fishing. The fishing grounds, techniques, and strategies for tuna fishing all differed from those they had mastered in targeting swordfish over the previous decade. The learning curve associated with tuna fishing meant that initial trips were less likely to return a profit, at a

time when money was already scarce. Once they were more accustomed to tuna fishing, their economic difficulties continued; interviewees nearly all mentioned a drop in tuna prices they attributed to a market now flooded with tuna.

A surprising financial effect, but one mentioned by a number of fishermen, was concern about paying lower taxes and the resulting loss to state and federal governments. As first-generation U.S. citizens, many of whom had come to the U.S. from refugee camps, they were proud of their citizenship status and ability to contribute to society. Swordfishing had treated them well, and they appeared to be generous in their sharing of that wealth, both with friends and family, and through their public service as taxpayers. They expressed regret at the resulting losses not just to other longline-dependent businesses, but to government services in Hawaii and the economy in general.

Impacts to Psychological Well-Being and Lifestyle

While the ban on swordfish targeting had a profound effect in terms of income, preferred fishing strategy, and preferred work locations, the owners and some captains and crew were able to find a way to keep fishing. The ability to keep fishing, however, was not without psychological cost. Interviewees expressed a range of emotions: bewilderment at the closure and its reported justification; loss of confidence that the family would be adequately cared for; shame at not being able to help family members here or elsewhere; sadness at the decrease in the quality of life; anger at the federal government for closing the fishery; frustration at being unable to thwart the ban legally or politically, at having to rely on others, and because the international fleet was not being regulated; and blame on entities both inside and outside the industry for their perceived inability to prevent or reduce effects of the ban.

A wide range of psychological effects can result from the stress associated with loss of income and associated effects. We did not utilize formal psychological measures, but likely effects included anxiety (being in a constant state of

worry) and depression (a strong mood involving sadness, discouragement, despair, or hopelessness that lasts weeks or longer). Anxiety and depression can affect one's ability to work, eat, sleep, and enjoy many aspects of life. Depression is a mental health condition already more prevalent among Vietnamese refugees (Brower 1980).

For example, one fisherman who moved his boat to California reported fishing there did not come close to meeting his expectations or needs. He only made three trips annually and lost money on most of them. From April to November he made only one trip, catching very few fish, and those sold for low prices. He considered himself fortunate just to cover expenses. The wife noted that this situation put a strain on her relationship with her husband because they were always thinking of the problems associated with the swordfish closure and fighting about what should be done. In addition, they could no longer provide for their parents, such a disappointment to her husband that he cried. She reported spending quite a bit of time in bed, feeling unable to get up and face the day.

Many of the fishermen expressed frustration with the swordfish ban in terms of its impacts on the quality of their life. Lifestyle priorities for many included not only the ability to sustain their fishing lifestyle, but to do so in Hawaii, a place they had come to love and prefer compared to the Gulf of Mexico and other places they had lived while participating in other fisheries. Many cited enjoying living in Hawaii because of its climate, social diversity and tolerance, schools, year-round fishing opportunities, availability of preferred food, presence of an active Vietnamese-American community, income potential from fishing, and the spirit of aloha.

Like many other commercial fishermen (Ender-Wada and Keenan 2005), the Vietnamese-Americans had many motivations for fishing beyond earning an income. Just one-quarter of the owners and one-third of the crew said they considered fishing as a way to make money only, and not meet other needs, although a higher proportion of captains (four of the six interviewed) viewed fishing primarily as a source of income (Table 2). Similarly, just 26 percent of the owners, compared to half of the captains and crew, said they would quit fishing if they could make more money at another type of job. The captains and crew members in general did not appear to be as attached to fishing as the owners, perhaps an indication of why the owners had made the large investments in their boats and gear. Some simply said "It's what I do; I don't know anything else."

As mentioned, most were also continuing a family tradition that had been a significant component of their culture, both back in Vietnam and in the U.S. Many spoke of the non-fishing employment they had experienced upon arrival in the United States (under refugee status), until networking within the Vietnamese-American community revealed the opportunities associated with fishing. They welcomed the return to the fishing lifestyle. One wife stated, "Personally, I don't get excited about this business, but my husband loves it and that's why we're in it. In Vietnam, good wives support husbands and what they love."

One crew member was divorced and in the process of sponsoring his two children, still living in Vietnam, to come to the United States. If the ban continued, he assumed that he would have to change professions, but didn't know what he would do. This worried him because it jeopardized his ability to bring his children to the U.S.

The uncertainty associated with the permanence of the closure was an added stressor, compounded by awareness of likely regulation or closure of the California swordfish fishery and doubts about the future of commercial fishing in general. Many fishermen were waiting for further legal action with the hope that the Hawaii swordfish fishery would reopen, but this affected their ability to make business decisions and increased the stress and anxiety associated with uncertainty. Some interviewees indicated a sense of hopelessness due to their inability to influence the ban and its effects.

Impacts to Families and Family Cohesion

Interviewees also reported a range of effects on the closeness and cohesion of their families and on their ability to meet family needs. When asked to explain the impacts of the ban, 18 percent identified spending less time with their family as the largest impact and an additional 13 percent specified the combined effect of decreased family time and economic loss. The types of impacts included physical separation of family members (when many individuals relocated to California) as well as disruption of normal behavior and financial stress, often reflected by increased arguments and conflicts within families. One wife said that the ban had increased the pressure and stress in the family due to constant worrying about financial problems, leading to an increased number of arguments.

Fishing families are accustomed to the husband and father being gone on long fishing trips and make a variety of coping accommodations (Binkley 2002). Swordfishing in Hawaii commonly required longer trips than did tuna fishing; it was not unusual for vessels to spend three weeks or more at sea. Although family members may not have liked this, they adapted primarily because of the financial benefits. Fishermen and family members also mentioned that the time between trips allowed for high-quality family time.

Relocating fishing vessels to California posed a new situation. Not only were the fishermen away from home for much longer periods of time, but wives typically traveled there for a week or more each month, further fracturing established patterns of family behavior. This was especially difficult for families with young children.

Some wives joined the work force as manicurists or coffee shop workers to help make ends meet. However, some who had worked previously were unable to continue because of their monthly commutes to California to assist their husbands in port between fishing trips. One woman moved in with her extended family (sister) and didn't see her children as much as before. There was also less time and money available for regular visits to family members or relatives living

in Vietnam or elsewhere in the U.S., creating greater distance among extended families.

The Vietnamese-Americans were very concerned about the effects on children, in addition to the longer periods of separation from their parents. Of the owners, 45 percent had four or more children and many had additional dependent family members in Vietnam or elsewhere to whom they provided financial support. Interviewees reported that the ban had a significant impact on their children's education, which was highly valued. Nearly all of the interviewees spoke about wanting their children to have quality educations so they would not have to fish for a living. Just 10 percent of the owners and one-third of the captains and crew said they would encourage their children to get involved in the Hawaii longline industry. One fisherman and his wife explained that they wouldn't want their children to become fishermen because as a group they are stigmatized as uneducated and unskilled. Despite the fishermen liking their jobs, many believed fishing was too uncertain, dangerous, or difficult for their children. This attitude toward their children's occupations was not caused by the swordfish fishery closure, but the closure appeared to reinforce and intensify their existing inclinations.

Some families curtailed or eliminated financial assistance to parents, extended family members, and family members living in Vietnam or elsewhere. A few fathers expressed their frustration and embarrassment at having to rely more on their grown children for assistance and being unable to fulfill their financial responsibilities. Several families said that curtailing financial assistance to families back in Vietnam was a major source of frustration, and, to some, shame.

Impacts to Community Cohesion

The main community considered in this research was the Vietnamese-American fishing community, but also the broader Hawaii longline community. Interviewees described the Vietnamese-American fishing community as a very strong and tightly knit group of people who could borrow money from each other and help each other out in many ways. All of the captains and 90 percent of the owners said that Vietnamese-American fishermen worked towards a common goal, compared to just less than half who said the entire Hawaii longline fleet (including Vietnamese-American, Korean-American, and Euro-American vessel owners) worked towards a common goal. Nearly all of the fishermen said they had a network of people with whom they share information, and that they had someone in the industry they could turn to if they needed help. Money, as well as information, was shared; many examples of no-interest loans made on an informal basis were described during the interviews. If times were rough for one family, another that was doing better would help them out and not expect repayment until the family recovered. Wives helped each other out in many ways when the men were fishing; if one spoke better English she would translate for the others. Bonds were strong because networks

of extended family, fellow villagers, or friends and fictive family members extended back to other fisheries (primarily the Gulf of Mexico) and to Vietnam.

As noted earlier, this strong sense of community would be expected to be a source of resiliency for this group of fishermen and their families, and it was. Yet respondents generally expressed a decrease in cohesion among the Vietnamese fishing community that resulted from the swordfish fishery closure. Several interviewees said the community became very discouraged after the decision: "Group morale is very low because income is down and there are uphill battles with no victory."

The drop in income, increased amount of time spent in work, and fragmentation of the community resulted in fewer social events such as the celebrations that occurred when swordfish boats returned to port. Several respondents lamented the end of the parties following successful swordfish trips, saying there was much less to celebrate now. The nature of get-togethers as well as the frequency changed; one woman said that she and her friends used to meet and have fun, but now they met to share their misery.

Many fishermen explained the decrease in cohesion as a decrease in actual activities, oriented toward the fishing business. Several interviewees mentioned existence of a formal Vietnamese-American Fishing Association that previously existed but dissolved following the ban. Some reported a decrease in collective action not only among the Vietnamese-American sector, but in the longline industry as a whole. Nearly three quarters (74 percent) of Vietnamese-American owners, captains, and crew reported that the industry had not met during the previous year to work on a fishery related issue. More than half (55 percent) said they were either "never" or "only occasionally" involved in collective actions related to the fishery.

One fisherman said that the unity of the fishing community had been severely hurt; now they had to hide information from others to survive. Another fisherman echoed this sentiment, saying before the ban if people found a school of swordfish they would radio their fellow Vietnamese-American boat owners to come share in the catch; now they no longer shared information because they needed all the fish they could get—it was a matter of survival.

The Vietnamese-American longline community was also more fragmented when some of its members relocated their boats to California, where they found no comparable Vietnamese-American fishing community on which to rely.

The ban also affected relationships within the broader Hawaii-based longline community. When the ban was first introduced, fishermen pulled together vigorously to fight it but enthusiasm and solidarity waned as time dragged on and the ban remained. Initially fishermen expressed hope that the Hawaii Longline Association (HLA) would be able to combat the ban legally. HLA members paid a proportion of their earnings toward these legal battles. However, as time wore on and the ban persisted, Vietnamese-American fishermen grew frustrated with the perceived diminished effectiveness of HLA. Some resented paying and the disenchantment affected

the unity of the broader longline community. One woman expressed frustration, saying they they had provided HLA with support, even though they were not making a profit, but received no benefit in return. Accordingly, they stopped attending meetings with HLA. Another husband and the wife expressed bitterness towards HLA, saying its leaders had successful businesses of their own and didn't take into account those who were not doing quite so well. One wife of an owner who went to fish out of California explained, "We haven't worked together since immediately after the ban." Interviewees said that before the ban there were niches for fishermen who fished for swordfish and those who fished for tuna; afterwards there was increased competition that over time reduced solidarity among the longliners and led to further segmentation of the industry.

Cumulative Impacts

The impacts of the swordfish fishery closure were compounded by effects of other regulations and trends affecting the longline industry. The Vietnamese-Americans who remained in Hawaii were now fishing for tuna, the same as the rest of the longline fleet, resulting in a greater supply of tuna and, in many cases, lower prices. Trips became less profitable so most local Vietnamese-American crew, who had been paid via shares, sought land-based employment. Owners had to seek alternate sources of crew, with most obtaining foreign crew from the Philippines. However, the events of September 11, 2001, made it more difficult and costly to bring foreign crew into the country. Other regulations or closures limited fishermen's ability to adapt by switching to other fisheries. Most prominent was the 2004 prohibition of swordfish fishing out of California, after which most of the vessels that had relocated to California returned to Hawaii. Fuel prices were increasing substantially, adding another barrier to profitable fishing. Prohibition of shark finning reduced a substantial source of income to crew and captains.

Commercial fishermen are used to dealing with regulations and would be expected to complain when they believe their ability to fish for a living is compromised. However, fishermen's anger and bewilderment at having an entire fishery closed, coupled with the belief that the closure was not justified and/or was not communicated adequately, appeared to reach unprecedented levels. Many indicated that in all their years of fishing, this was the worst they had been treated. One fisherman believed the only reason NMFS didn't put them out of business completely was to avoid having to initiate a buy-back program.

Conclusions

Before the swordfish closure, the Vietnamese-American fishermen had a high quality of life, and some owners had become quite wealthy from swordfishing. The time between trips allowed for high-quality family time, including vacations and visits to family members on the mainland and in

Vietnam. The cohesion and celebration of community was a contributor to quality of life for interviewees.

After the ban, quality of life declined due to financial, psychological, social, community, and related impacts. Although some types of effects were predicted in the Pelagics EIS, others, such as effects on community cohesion, were not adequately described. The spirit of community that existed among Vietnamese-American fishermen and extended to the broader Vietnamese-American community in Honolulu remained following the ban, although there were signs of its erosion. The increased conflict within the longline community occurred at a time when active social movements were emerging to further restrict longline fishing or prohibit it entirely. Issues have been posed by several organizations including bycatch of threatened or endangered sea turtles; overfishing on a global scale; mercury levels in swordfish and tuna and associated threats to human health; and the industrial scale of longline fishing and its effects on ocean ecosystems. The industry's future may depend on its ability to socially and legally defend and justify itself, which could be compromised by internal conflict; sectors of fishing industries fare better when they are able need to work cooperatively to address threats (Stead 2005).

As we have discussed, interpreting the magnitude and meaning of impacts resulting from the swordfish ban—other types of change—depends on the resiliency of the affected population (Hanna and Hall-Arber 2000). Some of the Vietnamese-American fishing households were more resilient than others and therefore more capable of dealing with the swordfish fishery closure because they had alternative sources of income. Some also had the ability to relocate their vessels to California, although this turned out to be a short-term strategy. Wives who had been able to hold jobs while the vessel was based in Hawaii were no longer able to keep their jobs because they had to travel to California every month. Wives of vessel owners who kept their boats in Hawaii and had not worked previously now were forced to find jobs to supplement family income. Either way, normal patterns of family behavior were disrupted, a cumulative impact on the already-tenuous balance of work and life present in many fishing families (Binkley 2002).

Another factor contributing to resiliency was the experience of having successfully adapted to changing conditions in the past. On average, the Vietnamese-American owners and captains interviewed had worked in three other fisheries before successfully adapting to swordfishing in Hawaii, demonstrating the potential for that method of coping. Although they were able to adapt, it was not without associated costs, and few were able to meet their goals of remaining in Hawaii and continuing to fish and make a successful living.

The FEIS had suggested that some of the impacts to Vietnamese-American fishermen could be mitigated through a vessel buy-back program. The interview results point to some of the problems associated with this assumption. First, a vessel buy-back program would not have helped captains or crew. Second, although some owners would likely have

sold their vessels, their families still would have needed income after the boat loans and other debts were paid—and the family's source of income would be gone. Third, it would have meant an end to the fishing lifestyle preferred by many of the fishermen, although fishermen could have refused the offer and converted their boats for tuna fishing. Finally, it would have led fishermen to abandon the hope that the swordfish fishery would return, and deplete the primary group of fishermen with the ability to resume swordfish fishing should the fishery be reopened.

One lesson from our studies is that social impact assessment requires some type of systematic discussion with the affected communities. In addition, it is highly desirable to monitor those affected populations to assess the extent to which predicted (or unanticipated) impacts actually occur, especially in situations where environmental justice is an issue. People and communities can be remarkably adaptable, often discovering ways of coping with negative effects that even they may not have predicted (Interorganizational Committee on Principles and Guidelines for Social Impact Assessment 2003). As one fisherman said, "At first we were devastated. After the ban, my job satisfaction went from a 10 to a 1. Now we've been learning and coping so maybe I'm at 5 now." Longer monitoring can reveal the short-term and long-term effects of regulations and fishermen's and industry's responses—information which can then be fed back into subsequent management efforts through an adaptive process.

Social and economic monitoring should be a key aspect of natural resource management planning and management to track the dynamic and complex consequences of regulatory change (Allen, Robertson, and Schaefer 1998; Hall-Arber et al. 2001). Ongoing monitoring of key social and economic indicators that reflect the well-being of the longline fleet and its associated communities, with a mechanism for feeding this information back into an adaptive management framework, may be the best way to ensure that social and economic effects and trends are considered as part of fisheries and ecosystem management.

Epilogue

Most of the affected fishermen did what they believed was needed with the hope and belief that the swordfish fishery would be reopened someday. In 2004, that is what happened, thanks to new fishing gear and techniques that reduced sea turtle interactions. NMFS re-opened the swordfish fishery, capping the amount of fishing effort allowed at about 2,120 sets and terminating fishing sooner if a certain number of sea turtles were caught. NMFS also required that all vessels targeting swordfish carry scientific observers and abide by certain restrictions on fishing gear.

Yet when the opportunity returned, there was not a rush to participate. Having converted their boats and spent considerable time learning to fish for tuna, some were reluctant to resume swordfishing and were not happy with the gear requirements that accompanied the fishery's re-opening.

A particularly grating concern issue was NMFS' method of allocating the swordfish sets, offering them to anyone having a longline permit who expressed interest in joining the swordfish fishery, whether or not they had ever fished for swordfish. (One reason for this allocation method was that longline permit holders had uniformly contributed to legal fees to contest the swordfish ban). The agency sent letters to all permit holders and then allocated an equal portion of the sets to all who expressed an interest in the fishery.

Vietnamese-American owners were unhappy with this method of allocation, feeling that the allocation should have been made on the basis of a past record of swordfishing. Although the set certificates were transferable and could be traded or given away (economists are studying the market and fishermen's behavior in this regard), interviewees said the prospect of having to purchase sets from non-Vietnamese-American owners was not a pleasing one.

In 2005 more vessels were going out to target swordfish and, although swordfish prices moderated, they were initially quite high. By the end of the calendar year, the cap on sea turtles had not been reached despite fishermen using most of the available swordfish sets. However, in 2006, the annual cap on sea turtle interactions was reached in March, closing the swordfish fishery for the rest of the year. In addition, all of the swordfish vessels out fishing had to return to port at the same time and unload their catch, creating a glut of swordfish and a corresponding steep drop in prices. It's clear that the glory days of swordfishing may not return, leaving an uncertain future for the Hawaii-based longline swordfish fishery and the Vietnamese-American fishermen and their families.

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