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From Vegetable Box to Seafood Cooler: Applying the Community-Supported Agriculture Model to Fisheries

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Community-supported fisheries (CSF) projects show signs of rapid growth. Modeled on community-supported agriculture (CSA) projects, CSFs share objectives of reducing social and physical distance between consumers and producers and re-embedding food systems in social and environmental contexts. This article offers a comparison of CSF and CSA, situated in the differences between seafood and agricultural products, and fishing and farming. We draw on economic and resource theory, past research on CSA, and a member survey from a case study CSF. Survey results show CSF members are interested in accessing high-quality, fresh, local seafood, and in supporting fishing communities, and they believe that participating in a CSF achieves both. They are less certain that a CSF can address environmental concerns, and few identify environmental motives as their primary reason for participating. The latter contrasts with CSA research results, and we contextualize these findings in our broader comparison.

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A refrigerator truck pulls into a parking lot at Duke University in Durham, North Carolina (NC), with a load of fresh seafood. As the drivers unload, graduate students from Duke's Nicholas School of Environment (NSOE) unfold a table and pull out a clipboard with a list of names. By 4 p.m., 25 people with coolers or plastic bags are waiting. By 4:30 p.m., things are hectic. Over 2 hours, 275 people pick up their weekly or bimonthly share of seafood. While they wait, members of the community-supported fishery (CSF) chat with others in line. When they get to the table, they often have questions. Are there extra fish heads to make stock? Is there more information on recipes? For the CSF organizers, the experience is exhilarating, and for participating fishermen, it is a new way to do business.

This scene occurred 12 times in late 2009, on Thursdays, during the inaugural season of North Carolina's first operational CSF, one that delivers seafood from Carteret County to shareholders in Durham, 175 miles away. A CSF involves an up-front purchase of shares in return for a weekly or bimonthly delivery of fresh, locally caught fish. As in community-supported agriculture (CSA), CSF members agree to take what they are given in their "cooler" (i.e., what has been caught). The CSF project "Walking Fish" was initiated by members of Duke University's student subchapter of the American Fisheries Society, to test whether the CSF approach—at that time restricted to two in the country—could work in North Carolina. The students were motivated by concern about declining small-scale fishing in North Carolina (Crosson 2007; Garrity-Blake and Nash 2007), and hoped their model could show the potential for CSF to provide additional income to fishers while simultaneously expanding their community support networks.

The students found their project successful. Consumers were found easily; 400 shares sold within three weeks, and more than 400 would-be members joined a waiting list. For the second season (April–June 2010), 400 shares sold in four days. By collaborating with a Carteret County-based seafood processor, a core group of five fishermen, and one fisherman's wife, Walking Fish managed the logistics of getting seafood to its members. In 2011, entering its third year of operation, Walking Fish established a second operation delivering to Raleigh, NC.

Based on the experience of CSA in the United States, we expect rapid expansion. The first successful CSF started in Maine in 2007 (Port Clyde Fresh Catch), and the website LocalCatch.org (established 2011) currently lists 32 CSF projects that deliver seafood to more than 126 locations. In this article, we are interested in the comparability of CSF and CSA in terms of both operations and more theoretical questions about the communities created by CSA and CSF, the physical and social distances involved, and the "nature" of the commodities in play. Although CSF is loosely modeled on CSA, there are important differences between fishing and agriculture that challenge the direct applicability of the CSA model to fisheries. Nature's difference makes a difference (McCarthy 2006), and we explore such difference here.

In the following, we review the experience of CSA in the USA regarding efforts to increase personal or community control over food systems and to reduce physical and/or social distances between producers and consumers. We highlight two

thematic concerns in both CSA and CSF: environment and community. We discuss the challenges for fishers versus farmers in addressing these concerns and ask what types of attitudes we expect to find among members toward them. For example, does the nature of CSF versus CSA affect how members conceptualize the environmental impacts of their participation? We then discuss research on CSA that highlights the challenges of realizing the model's theoretical goals in practice, and ask what this implies for CSF.

With the comparison developed, we describe the Walking Fish CSF and a survey of members participating in the inaugural season. These data represent the first collected from CSF participants, and facilitate exploration of our academic interests (e.g., in embedded economies; the nature of common pool resources) and practical goals (e.g., to consider the potential of CSF in the long term). As students involved in Walking Fish (Coppola, Stoll) and researchers studying changing fishing economies and communities (Boucquey, Campbell, Smith), we are interested in the potential for CSF to address some of the problems associated with contemporary fisheries, for the environment and fishing communities. Given current interest in local food and expansion of CSF, this work is timely and relevant to academics, fishers, and managers. We use the acronym CSF (and CSA) to refer to the general concept of community-supported fisheries (and agriculture) and CSFs (and CSAs) to refer collectively to CSF (and CSA) projects.

From CSA to CSF

The CSA Model

The first CSAs in the United States date to the 1980s, and there are currently an estimated 2500 (Local Harvest 2010). CSA arose in response to concerns about the globalization and industrialization of agriculture, including the increased use of herbicides and pesticides; the homogenization of agricultural crops; the loss of family farms and related change to the social, economic, and cultural fabric of the countryside; and the distance and disconnect between food production and consumption (Kloppenburg et al. 1996; O'Hara and Stagl 2001). More recently, concerns over food security have been added (Allen 1999; Guthman et al. 2006). CSA is one of various responses seeking to relocalize food production and consumption (see Feagan 2007).

CSAs traditionally involve consumers prepurchasing a share in the crops of a farm, thus sharing risks incurred by farmers growing local, often organic, food. Farmers benefit from the trust and infusion of funds (and sometimes labor) from members, and increase the net price they receive by eliminating the costs of getting produce to market. CSA members receive fresh produce, the knowledge of where and how their food is grown, and the satisfaction of supporting their local farmer. Farmers and members may develop close social ties, and a mutual appreciation of their lifestyles (Carolan 2007; DeLind 2002). These ties are often central to CSAs, which aim to distinguish themselves "from other types of direct agricultural markets [by their] special emphasis on creating and building community around the interwoven issues of food, land, and nature" (Hinrichs 2000, 299). In many cases, linkages are made between urban and rural (Feenstra 1997).

In theory, CSA makes explicit the social and environmental repercussions of economic choices. Polanyi's (1944) notion of embeddedness is often invoked to describe how CSA represents an alternative to highly capitalized agricultural

practices. For Polanyi, economic transactions are always embedded in broader social and material relationships. He argues that modern social history is marked by "double movements" wherein expansions of the so-called "free" market system are matched by political movements designed to reign in its more destructive social repercussions. In this context, CSA is a countermovement against the disembedding of food markets from social life, and contemporary scholars extend Polanyi's analysis to include the environment (e.g., O'Hara and Stagl 2001). Feagan and Henderson (2009) argue that the model has a radical economic orientation based around the extension of social relationships and the idea of community. By joining a CSA, members make a voluntary contribution to community and environmental public goods, goods that the free market underprovides.

The concern with re-embedding markets in the social fabric of communities is closely related to CSA's emphasis on place and legible commodity chains. By creating local systems of growing and distributing food, CSA members are empowered by knowing where their food comes from and who benefits from their purchases. Hence CSA is also a political project "even if the immediate project objective seems small" (Allen 1999, 120); movements to "eat local" may be expressions of resistance to a global market system and a defense of the importance of place (Feagan 2007; O'Hara and Stagl 2001). Some analysts question, however, whether an emphasis on the local hides connections to larger economic networks or environmental impacts (Kloppenburg et al. 1996; Watts et al. 2005), and others warn of "defensive" or "regressive" localization and its effects (Feagan 2007; Goodman and Goodman 2007). Analyzing particular connections and reconnections made between food producers and consumers, food production and particular places, and food production and sociopolitical or economic change is thus key in work on food systems (Winter 2003).

Thematic Concerns of CSAs and CSFs

How do concerns about agriculture that led to CSAs in the 1980s translate into concerns about fishing and the emergence of CSFs in the 2000s? We compare several ways the primary goals of CSA and CSF may be manifested differently, because of the nature of fishing practices, resources, and ownership.

Environment

An estimated 96% of CSA farms are organic (Lass et al. 2003), reflecting their opposition to intensive use of fuel, fertilizers, and pesticides in industrial agriculture (Lyson and Guptill 2004; Wells et al. 1999). CSA marketers "quite clearly attempt to tie consumers' food-buying patterns to considerations of conservation and the environment" (Anderson-Wilk 2007, 126a), and CSA farmers are able to distinguish their own environmental practices and products by being certified organic by the U.S. Department of Agriculture (or equivalent designation in other countries).

As with farming, there are interlinked environmental concerns associated with fishing. Overfishing is one often-cited (but contested) concern, with 20%–30% of federally monitored commercial fish species considered overfished (NOAA Fisheries Service 2011). Efforts to address this are complicated by the challenges of governing so-called common-pool resources. Unlike farming, where landowners control land use and thus can make claims about stewardship, in fishing there are various

institutional arrangements that govern activities. Any arrangement must grapple with two main issues: Fishery resources are subtractable (i.e., fish taken by one user cannot be taken by another), and it can be difficult to exclude fishers. ''Open access'' occurs when no formal or informal access restrictions exist. Although true open-access fisheries are rare (e.g., Mansfield 2004; St. Martin 2001; Berkes 2003), the mobile nature of fish and fishers makes it difficult for CSFs to ''prove'' their impacts. Unless CSFs have the means to address the problems of subtractability and exclusion (via informal or formal mechanisms), their efforts to reduce environmental impacts—for example, avoiding overfished species—can be undermined by fishers operating in the same place who are not subject to CSF constraints.

A second environmental concern is the impacts of fishing on habitat (Watling and Norse 1998) and on nontarget species (Crowder and Murawski 1998). Although various nontarget species are caught as bycatch, the problem is particularly politicized when protected and charismatic species are at stake (Campbell and Cornwell 2008). The problem of sea turtle bycatch in large-mesh gill nets is an ongoing issue in North Carolina, a point we return to later. Fishers have some choice over what gear types they fish with and what they target; however, while farmers may be able to choose among crops and produce them using a variety of methods, fishers can choose only among locally available species, and some species of fish can be caught only with certain gear. This is a potential issue for CSFs; consumers may expect to receive species of fish that cannot (at least with current methods) be caught without a certain level of bycatch.

A third set of environmental concerns lies with the rise of industrial aquaculture and the amounts of imported seafood in the United States. These concerns arise from the environmental impacts of some aquaculture operations (Dierberg and Kiattisimkul 1996), genetic manipulation of aquaculture species (Smith et al. 2010), and uncertainty about the impacts of fishing in places where fisheries are less regulated. These environmental concerns are linked to others. Seafood consumers may be concerned about impacts of aquaculture on habitat, health effects of antibiotic use, fossil fuels required to ship seafood to the United States, and effects of relatively cheap imports on domestic fishers. CSFs offering wild-caught, domestic seafood are well positioned to address these concerns.

Community

Community, and how to create, sustain, or enhance it, is central to CSA. CSAs have traditionally been concerned with loss of community via changes in rural land use, including the loss of family farms (O'Hara and Stagl 2001). Community concerns are matched in CSFs, and linked to declining commercial fishing (Hall-Arbor et al. 2001). These declines have several causes, including industry contractions after overcapitalization in previous decades, management trends toward market-based solutions such as catch shares that may lead to industry consolidation, and a globalizing fish trade driving down domestic seafood prices and creating disincentives for maintaining seafood processing infrastructure (Brewer 2011; Hanna et al. 2000; McGoodwin 1990). In our study region, economic and cultural history centers on the fishing industry and there is a widespread sense of loss stemming from its decline (Earley and Amspacher 2008; Maiolo 2004). These broad concerns are tightly intertwined with ideas about culture, family, and the future of local villages (Boucquey et al. 2012; Campbell and Meletis 2011).

While CSFs may share community-strengthening goals, the possibilities for doing so are affected by the characteristics of fish and fishing, and the nature of the threats to community. The "family farms" defended by CSAs are primarily threatened by the consolidation and industrialization of farming. Although this is true for some U.S. fisheries, the competition faced by fishers in Carteret County, NC, is from imported seafood. Fishers are also subject to seasonal, spatial, and gear restrictions that exacerbate their difficulties competing with inexpensive imports. Nevertheless, CSFs could turn these challenges into strengths by emphasizing local, low-impact, and in-season seafood products. As most conventional seafood travels thousands of miles, opportunities to decrease the distance between production and consumption through CSFs are considerable. However, as many places lack access to the ocean or freshwater systems large enough to support commercial fishing, CSFs will need to weigh questions about "local" and the extension of community with questions about how many food-miles are considered environmentally and socially acceptable. Though similar questions exist for CSA (Kloppenberg et al. 1996), distances are of a potentially different magnitude for CSF.

In CSA, there is an emphasis on "getting to know your farmer" through face-to-face interactions that can include farm work (Feagan and Henderson 2009). Such interactions may be difficult to achieve in CSF. First, it is unlikely that most people would want to participate in commercial fishing, and it could be a burden and liability for fishers to allow inexperienced people aboard their boats. Second, fishing involves long hours, nighttime fishing, and unpredictable schedules, thus constraining potential interactions between fishers and consumers. Third, few fishers own dock space or facilities where members could come to process fish or pick up their shares. While the practice of farming is tied to a place that the farmer owns, fishermen do not own a place of fishing per se. Depending on how far CSF members are from the coast, it could even be challenging for fishers to participate in deliveries. Fourth, although individual farmers can run a CSA, individual fishers may find this less feasible, given the unpredictability of fishing and the implications for consistent product delivery. An intermediary may be needed to facilitate seafood transport, and individual fishers may have to cooperate and combine catches. These factors mean that the community-building possible through CSF will likely be different than what is possible through CSA.

Implementing CSAs and CSFs

Research on CSA suggests the theoretical ideal has been elusive in practice. CSA members remain highly cognizant of price, and often assess the value and amount of produce they receive rather than their contribution to a farm (Feagan and Henderson 2009; Hinrichs 2000; McIlvaine-Newsad et al. 2008). Many members conceptualize CSA as a different kind of vegetable market, rather than an alternative to market. Farmers have difficulty thinking of member investments extending beyond the weekly transaction, when they "owe" members produce (Feagan and Henderson 2009), and they tend to devalue their labor and rarely charge enough to cover retirement or health benefits (Brown and Miller 2008). Thus, the ambition to create highly supportive economic relationships between farmers and community members is not necessarily reflected in mainstream CSA.

Similarly, people's primary motives for joining CSAs focus on the value and quality of the food. Brehm and Eisenhauer (2008) found that a desire for "fresh,"

"pesticide free," and "locally grown food" was the most important motivator, followed by a desire to support local farmers and the local economy. People were not motivated to build community or social capital. O'Hara and Stagl (2001) found that environmental concerns were the most important; although members wanted to support local farms, they were less interested in building relationships. Feagan and Henderson (2009) distinguish between the "supporting" and "sharing" elements of CSAs, and suggest that most people are interested in "supporting" farmers rather than in "sharing" in things like decision making, labor, or social relationships.

How people conceptualize the purpose and role of CSA within their socio-economic lives, and whether this matters in terms of the work CSA does to reduce some of the social and economic distances involved in food production, remain open questions. These are equally relevant for CSF, but may be answered differently. Although CSA and CSF members may share motives for participating, and projects may share basic philosophies and structures, we have identified several challenges facing CSF based on the nature of the resources involved. In particular, CSF faces constraints on the ability to change the environmental impacts of fishing and to build community through face-to-face interaction. We turn now to explore these issues with the case of Walking Fish and our survey of the participants from the pilot season of 2009.

The Walking Fish CSF

Graduate students at Duke University's NSOE launched Walking Fish in September 2009. In March 2009, the group presented the idea to Carteret Catch, a coalition of fishers, restaurant owners, and fisheries researchers promoting locally caught seafood in Carteret County, NC. During the summer of 2009, the students met with Carteret Catch several times, to provide updates, seek input, and address the organization's questions and concerns. Students researched the local seafood industry, seafood availability and regulations, and consumer demand and preferences. They created a website (www.walkingfish.org), began an advertising network, and worked with a seafood processor and retailer, Fishtowne, in Carteret County where the Duke Marine Lab is based, to develop a business model that would cover the costs of processing and transportation and pay fishers a higher price for their catch.

The goals of Walking Fish were to increase consumer access to local seafood, offer fishers higher prices, support a dialog about local food systems, fisheries, marine conservation, and community development, and develop a model that could be adapted elsewhere (Stoll et al. 2010). The goals were framed in terms of a "triple bottom line" seeking to balance the social, economic, and environmental. Although project organizers were concerned about the plight of NC fishing communities, some members of Carteret Catch and the larger fishing community were initially suspicious of Walking Fish and its environmental goals. As the project continued and the role of fishers increased (described later), suspicion mostly abated, and the original goals have remained in place.

Walking Fish's partnership with Fishtowne facilitated the logistics of processing large quantities of fresh seafood and driving it 175 miles inland. Fishtowne drew on existing and new relations with fishers to fill orders and fishers received $\sim$30% premium for their catch (Stoll et al. 2010). Although the students and their donated labor were initially critical to the project, a group of fishers and Fishtowne formed a cooperative to take over Walking Fish in fall 2011, and revenues are sufficient

to employ two part-time coordinators. Walking Fish has received positive press coverage in local (Duke University New Service 2009), regional (The State of Things 2009), and national media (Duchene 2010) and inspired a second North Carolina CSF, formed in June 2010. Although there have been technical, political, and economic challenges throughout the project, it met and exceeded most of the organizers' expectations.

One challenge is relevant for the analysis that follows. In February 2010, during the first year and second season of Walking Fish, the Karen Beasley Sea Turtle Rescue and Rehabilitation Center filed a lawsuit in federal court against the North Carolina Division of Marine Fisheries (NC-DMF) for authorizing the use of gills nets in waters not covered by an "incidental take" (i.e., bycatch) permit for federally protected sea turtles, as required by the U.S. Endangered Species Act. Some gill nets experience high levels of bycatch of various species, and large-mesh gill nets can be problematic for sea turtles. In Carteret County, many small boat inshore fishers use large mesh gill nets to catch flounder, one of the region's most important commercial species (NC-DMF 2011).

Duke University's Environmental Law Clinic, a joint initiative of Duke's Law School and NSOE, represented the plaintiffs in the lawsuit. The bycatch lawsuit was profiled in a variety of Duke media on campus, where most Walking Fish members are based, and some Walking Fish organizers suggested excluding large-mesh gill net caught species (i.e., flounder) from CSF offerings. However, excluding flounder had the potential to make the CSF unviable for three reasons. First, Walking Fish might not have been able to fill orders. Second, Duke's role in the lawsuit exacerbated suspicion about Walking Fish's environmental goals, and excluding flounder would have confirmed some fishers' worst fears. Third, student organizers were committed to the project's goals to support fishing communities and recognized that the repercussions of the bycatch lawsuit were potentially profound. After intense negotiations among organizers, they decided to continue to include flounder in the CSF. This context provides additional insights into the motives and commitments of CSF participants discussed in the following.

Methods

Walking Fish Member Survey

Results are from a survey of Walking Fish members in the 2009 inaugural season. The online survey had 32 questions, on participant demographics, motivations and satisfaction, prior seafood purchasing and consumption habits, and participation in and perceptions of local food systems in general. Most questions used a 5-point Likert scale and there were a number of ranking questions related to preferences, for example, the popularity of particular species provided in the CSF.

We focus on a subset of questions that asked respondents to identify the most important motive for participating; assess the extent to which CSF can address environment, community, and other concerns (referred to as CSF potential questions); and provide feedback on any part of the CSF. In addition, responses to questions related to satisfaction with the CSF, seafood consumption habits, and interest in local food systems help to contextualize respondent participation in the CSF.

The survey was repeated in the CSF's third season (fall 2010), but we focus on the 2009 data because we lack the means to avoid double counting (e.g., of 264

respondents to the 2010 survey, 127 had also participated in 2009 and may have completed the survey both times). The exception is that we consider the open-ended comments in both years, to capture those made before and after the bycatch lawsuit.

Results

Walking Fish Member Responses

We received 226 completed surveys, and 19 partially completed surveys with usable data, for a total of 245 responses and a response rate of 61%. Respondents were generally positive about the potential of CSF to address a variety of concerns, which was not surprising given that they chose to participate in Walking Fish. Nevertheless, there are subtle and sometimes significant differences in responses, which we explore further under the categories of environment, community, and other motives.

Environment

Only 13% of respondents identified the environmental benefits of eating local seafood as their primary motive for participating (Table 1), although the majority were positive about the environmental potential of CSF (Table 2). However, when compared with other CSF potential questions, more respondents expressed uncertainty or doubt about environmental potential, that is, the ability of CSF to minimize the negative impacts of seafood pricing (18% were uncertain or doubted this) or of their own seafood consumption (21%) on the environment. The response distributions for these two questions are significantly different from all of those related to potential impacts on community (Table 2).

In open-ended comments, few respondents mentioned environmental aspects of the CSF. Almost all comments were negative (Table 3), and all negative comments concerned gill nets. For example, one participant wrote:

> I would like to encourage Walking Fish to take a "no gill net" stance. While I realize that gill nets are legal . . ., they are an unsustainable fishing method. I would be willing to pay MORE for a gill net free share. (2009)

In fall 2010, the first Walking Fish season following settlement of the bycatch lawsuit, comments on the environmental aspects of the CSF were fewer, but in a similar vein:

> I love the food I get, and I love the fact that I'm supporting local fishers. However, I do worry about the environmental impact of seafood consumption in general and the impact of specific fishing methods specifically. Keep walking that line, be honest, and thanks! (2010)

Table 1. Primary motive for participating in the Walking Fish CSF

Motive	Percent respondents
Access to fresh, high-quality seafood	55
Support North Carolina fishers and their communities	22
Environmental benefits of eating local seafood	13
Desire to increase seafood consumption	4
Other	6

Table 2. The environmental, economic, community, and health potential of CSF (% of respondents)

Statement	Strongly agree	Agree	Unsure	Disagree	Strongly disagree
1. Purchasing fish from a CSF is a way to support local fishers and their communities	90	8	0	0	2
2. A CSF is a way to counter the disadvantaged position of NC fishers in a seafood market dominated by cheap foreign imports	70	19	8	1	1
3. Local seafood is higher quality than nonlocal seafood	63	25	10	0	1
4. Fishing communities need help if they are to survive in the face of increased coastal development	59	29	12	0	1
5. Eating more fish will improve my overall health	52	34	11	2	1
6. Purchasing fish from a CSF is a way to challenge seafood pricing that discounts environmental impacts of fishing	51	32	16	1	1
7. Purchasing fish from a CSF is likely to decrease the overall environmental impact of my seafood consumption	39	40	16	3	2
8. A CSF provides seafood at lower prices than other purchasing options	16	27	38	17	1

Note. Pairwise comparison using Fisher's exact test shows response distributions to community potential questions 1, 2, and 4 were significantly different from response distributions to environmental potential questions 6 and 7.

Table 3. Summary of responses to open-ended solicitation for feedback (% of respondents)

Response category	2009 ($n = 59$ responses)	2010 ($n = 39$ responses)	Common themes
Positive	46	37	General enthusiasm; seafood quality; support fishers; local food; CSF community
Suggested improvement	51	33	Organization/logistics; choice; information
Complaint	4	29	Variety; specific species; preparation; environment

Community

Supporting fishing communities was the second most frequently selected primary motive for participating (Table 1), and respondents were confident in the ability of the CSF to deliver such support; they agreed that CSFs support local fishermen and their communities (98%), CSFs can help fishers compete in a market dominated by cheaper foreign imports (89%), and coastal communities need help to survive in the face of coastal development (88%) (Table 2).

In open-ended comments, those relating to supporting local fishers were the second most frequent positive comments (Table 3).

> I especially liked that this project allowed me to enjoy a good product, while at the same time supporting local NC fishermen. I am a native North Carolinian and aware of the changes occurring along the NC coast and of the challenges these pose for local fishermen and their families. I hope that this project provided them with benefits and opportunities, as well. (2009)

Some respondents recognized the distance between members and fishers, but valued the community-building nonetheless:

> And please express my gratitude to the fishers. Not only is Walking Fish helping me feed my family good food, it's helping me raise grateful kids. . . . I think it's important that my guys know who is feeding them, and even if the fishers can't hear them, I like my boys to say thanks. (2010)

One respondent expressed a desire to spend a day on a fishing boat, and several commented appreciatively on or wanted more information about specific fishers. Two respondents questioned support for local fishing communities, suggesting that the CSF should ensure proper working conditions for paid laborers, and that the Walking Fish model might undermine other initiatives to promote local seafood that do not benefit from free student labor. These views were exceptional (in number, tone, and level of detail), and contrasted with many general statements asserting positive benefits of Walking Fish for fishing communities.

Open-ended comments also reflect interest in a second type of community:

> I love the way Duke students, Durham residents, and local fishermen all team up for this. This kind of community building is really inspiring and healthy. (I specifically like seeing Duke supporting our local industries.) But the best part for me was the way this turned into "community building" within my own family. We'd plan weekly dinners together on Fish Night, get all excited to see what kind of fish was coming, and trying new recipes, and cooking together. . . . It was really fun! (2009)

The sense of a CSF community is echoed in comments posted on the website's members' forum, where one participant who also helped on pick-up days posted as follows:

> "Mr. Smith [pseudonym], you have a choice this week! Would you like a pound and a half of shrimp, or a mix of shrimp and flounder." Flipping

> the page of the cookbook and without looking up, Mr. Smith said slowly in his heavy accent, "Hmmmmmm, I don't know. This is a very existential question, you know?" The member next to him chuckled. The idea of a smile worked its way onto his face. . . . I wish I could remember what he chose, but don't. What I do remember was the feeling I had. That we had had a moment . . . we were creating community. We have 4 more weeks in this first season of Walking Fish and . . . I am confident that by the end I will have done something more special; become part of a group that in our own small way will change the world. (Walking Fish volunteer, 2009)

The desire for community is reflected even in respondent complaints:

> I felt like I was a little too anonymous at some points. . . . I got the fish every week, but the account was in my wife's name, and every single week I had the same conversation . . . about me picking things up for my wife. I understand there are a lot of people doing this, but after 8 or 9 weeks I had hoped that something would change. (2010)

Other Motives and Tensions Among Them

Most survey respondents (55%) identified a desire for fresh, high-quality seafood as their primary motive for participating (Table 1), and 88% of respondents believe locally caught fish to be of higher quality than nonlocal seafood (Table 2). Respondents were satisfied or very satisfied with the quality of seafood, and among positive open-ended comments, quality of seafood was most often praised. Quality was associated with freshness and linked to seafood being local. This enthusiasm for seafood contrasts with participants' prior consumption habits. Prior to the CSF, the majority of respondents (63%) ate fish two or three times a month or less and few (15%) purchased their fish from specialty fish markets. The desire for fresh, high-quality seafood comes with a cost; although 43% of respondents believed the CSF provided seafood at lower prices, 56% were uncertain or believed prices were higher. Regardless, 88% were satisfied with price.

Respondents were enthusiastic overall. Ninety-five percent were satisfied or very satisfied, 93% were likely to participate again, and 95% would recommend the program. Nonetheless, one complaint dominated the open-ended comments: variety of species received. Most complained that there was not enough variety or choice; others complained about getting too little of species they liked and too much of species they did not like. Comments suggest varied levels of commitment to the CSF model:

> I wish the variety were greater, BUT on the other hand, I don't create much variety when I'm buying for myself either. Of course I realize you can't grow different fish like you can veggies. . . . (2010)

> There wasn't nearly the variation I had hoped for—it was mostly small whitefish. I would have really liked to see some more clams, shrimp, crabs, oysters, or a wider variety of fish. (2009)

Figure 1. Jumping mullet (*Mugil cephalus*). Photo by Joshua Stoll.

Most common among complaints about specific species were those relating to spot and jumping mullet (Figure 1), two locally abundant species.

> The jumping mullet was an incredibly unsatisfying choice. For the money paid and the quality of the other seafood that we received, the jumping mullet was just awful. (2009)

> Our weekly cost far outweighs what a fish like this costs. I would rather not have a delivery at all than a trash fish like spot. (2010)

Discussion

The most striking difference between Walking Fish member motives and those identified in CSA research is how few of the former are environmental. CSF members also express higher uncertainty about environmental outcomes than others. Where we find more similarity with CSA are in the dominant motives; Walking Fish members want to obtain high-quality, fresh, local seafood and support local fishing communities. However, results from CSA research suggest that both "local" and "community" need to be further scrutinized. We do so in the following sections, by discussing our results in the context of three issues associated with this case: (1) large-mesh gill net fisheries; (2) jumping mullet and spot; and (3) distance between Walking Fish fishers and members.

Fishing with Large Mesh Gill Nets in North Carolina

Controversy over sea turtle bycatch in large-mesh gill nets was high during Walking Fish's first year of operation, and Duke was implicated in the bycatch lawsuit. Although some survey respondents complained about large-mesh gill nets, the issue was less controversial than Walking Fish organizers expected. Indeed, there were fewer complaints after the lawsuit was resolved, when awareness of gill nets was presumably higher. Given the strong emphasis by CSA participants on environmental issues (Brehm and Eisenhauer 2008; Lass et al. 2003), we found the result surprising.

The lack of attention to bycatch and environmental concerns more generally could be due to several factors. First, respondents may not have been aware of the gill net controversy; it may have been too "distant" (physically and socially) for Durham-based CSF members. Second, for 2010 respondents, Walking Fish may have done a good job explaining its decision on flounder, or respondents may have believed the lawsuit settlement "solved" the bycatch problem. Third, members may recognize the difficulties fishers have in guaranteeing environmental sustainability, and this could translate into their low interest in or expectations of the CSF in this regard.

Although our data cannot answer the question of why survey respondents did not express more environmental concern, the gill net problem also illustrates the tensions among goals of supporting fishing communities and promoting environmental sustainability. In including flounder in the CSF cooler, Walking Fish ostensibly prioritized the former. However, the choice was also informed by the nature of fisheries resources. Organizers knew that regardless of their decision, flounder would continue to be fished by non-CSF fishers (and by CSF fishers selling through other channels), though with more restrictions after the lawsuit settlement.

The Problem of Spot and Jumping Mullet

Including spot and jumping mullet in the CSF cooler meets many of Walking Fish's goals. As locally abundant, low-value species, spot and jumping mullet subsidize the inclusion of other species, keeping overall share costs lower for members and earning a premium for fishers. Caught with small-mesh gill nets often deployed and retrieved with a "strike" method, these species are not known to be associated with bycatch. Developing markets for them could reduce pressure on less abundant species, and their inclusion reinforces Walking Fish's interest in promoting locally abundant, seasonal fish. That spot and jumping mullet are consumed by fishers and long-time coastal residents offers opportunities for community building, by introducing urban consumers to locally eaten seafood. This is parallel to the goals of many CSAs that emphasize the "uniqueness" of particular places and reassert the value of local food production (Allen 1999; Andreatta et al. 2008; Feagan 2007).

However, many members resisted inclusion of the very fish that required the fewest trade-offs among Walking Fish goals. In contrast, desired species—in particular, flounder—are at the center of the gill net controversy. Combined with the general complaints about variety, these results reflect findings from the CSA literature that consumers have difficulty accepting fewer or different product choices (Feagan and Henderson 2009; Hinrichs 2000). Although share-buying CSF members theoretically agree to accept what is caught and/or nothing, many assess price per cooler and want greater say about cooler contents. This may mirror the problem of homogenization in agriculture (McIlvaine-Newsad et al. 2008); if consumers have grown accustomed to seeing particular species on every menu (e.g., shrimp, tuna, or salmon), they may resist learning about new species or have difficulty acquiring a taste for them.

Distance, Community, and Localness

Opportunities for direct interaction between fishers and members are constrained by the 175 miles between Carteret County and Durham. When fishers participate

in distribution, the interaction occurs in a Duke University parking lot—consumer rather than producer territory. CSF participants seem untroubled by this distance and, since much of the seafood consumed in the USA is imported, 175 miles represents a significant reduction in the material distance between production and consumption. Overall, most respondents seem satisfied with a "supporting" rather than "sharing" relationship.

And yet, face-to-face communities are being built among participants and among fishers. In the first case, the logistics of distributing fresh seafood requires members to come together over a short period of time. Respondents express the sense that they are participating in something important and good, and are proud to be part of Duke's effort to do something for the community. Neighbors sometimes share memberships and cook together, and participants describe the "fun" and sometimes "joy" of cooking fish with their families and friends. Thus, a CSF community independent of direct interaction with fishers has developed and is valued by members.

In the second case, a new community has been built among fishers who, with Fishtowne, formed a cooperative in 2011 to take over Walking Fish. Given the number of people involved in fisheries who told us a cooperative was a "non-starter" and would "never work," this is particularly remarkable. We suggest that the reality of the contemporary fishing economy in Carteret County and the CSF opportunity provided incentives for some fishers to experiment. Supplying the CSF necessitated cooperation, and thus the new business model resulted in new forms of social organization. Although not the community building envisioned in the original CSA model, community has been built.

The unique emerging communities within CSF raise further questions about the relationships between natural resources, social systems and economic markets. As St. Martin (2006, 170) asks in relation to his work with New England fishers:

> Does the emergence of community herald an opening/disruption in dominant forms of economic discourse such that community and cultural processes might be seen as fundamentally part of economies and the natural resource regimes they constitute?

Applied to the Walking Fish experience, this question returns to the idea of embedded economies. Our findings suggest that the CSF model has the potential to foster new social ties among some community groups and new conversations about how particular economic choices (i.e., selling or buying fish in a CSF) might also encompass cultural values. To what extent these conversations and activities are consciously enacted as "countermovements" against a larger seafood regime or are manifestations of more immediate financial and social interests are questions for ongoing research.

Unlike early CSAs, CSFs are developing amidst widespread interest in "local" foods. In just one of many examples published over the last year, the food magazine *Bon Appétit* listed CSFs as 1 of 25 "top food trends" for 2012. While CSA and other alternative food movements have long argued for more local sourcing (O'Hara and Stagl 2001; Watts et al. 2005), the local food trend is now mainstream, with interest arguably surpassing that for organic (Goodman and Goodman 2007). Various ideas—about environment, economy, what constitutes "good" food, and geography—are combined in and conflated with a local food system (Feagan

2007). Walking Fish members may assume that eating local achieves a variety of things, but these were infrequently specified in the survey. Research among CSA members, though, has found that in idealizing local farms, members perceive benefits "ranging from perceptions of better taste to higher-order meanings related to cultural ideals of safety, rural authenticity, [and] anti-materialistic moral virtues" (Thompson and Coskuner-Balli 2007, 292). Further research is necessary to determine how CSF participants conceptualize "the local" and to what extent this influences their beliefs about what CSF accomplishes.

Although the "localness" of Walking Fish was mostly unquestioned by members, it was discussed among the organizers and occasionally challenged by outside observers (e.g., fishers not supplying Walking Fish, other students at Duke). Questions about how geographically proximate one must be to be "local" relate both to the existence of Walking Fish and some of its central challenges. For Walking Fish, the student-led organization was an intermediary, facilitating the transfer of fish from producer to consumer and receiving a share of the profits for doing so. For some, this is the type of "middleman" that local food systems should eschew. However, this was not a problem identified by survey respondents, and it may be useful to expand characterizations of "alternative food networks" to consider not only length of supply chains, but their character as compared to capitalist "norms" (Watts et al. 2005). When run by students, Walking Fish's share of profits was reinvested in project infrastructure and, if anything, the project was criticized for not being "capitalist" enough, with expressed concerns that it alienates fishers who share a different economic philosophy, promotes an unsustainable business model, and undermines other efforts to improve fishing economies that do not enjoy the subsidy of free student labor.

Conclusions

Overall, our initial experiences with and research on the Walking Fish CSF suggest that some of the theoretical benefits of CSA, now pursued by CSF, will be difficult to realize in practice. Although many reasons for this are similar for CSF and CSA (e.g., member interest in supporting rather than sharing relationships; value-for-money assessments), others arise from the nature of fishery resources. In particular, it is unclear how CSFs will effectively address environmental concerns associated with conventional fisheries, and we suspect this ability will be highly context dependent. It is also unclear that this matters to CSF participants. The limitations on face-to-face community building among fishers and members also arise from the physical distance between fishing communities and CSF members, and the nature of fisheries work. Although we find community building among fishers and among CSF members, the more limited community building across these groups does raise questions. If members are unable to identify with fishers, will this impact member retention? Will it reinforce rather than reduce the perceived social distance between these groups, allowing assumptions about the other to remain unchallenged?

The economic situation in many U.S. fishing communities is such that new models and options are needed, as evidenced in the recent rapid growth of CSF. If CSF is to be more than a financial option, further work is required to understand the possibilities for and constraints on its potential to contribute to an alternative food system, with social, environmental, economic, and ethical components. To move forward with this work, we suggest several key areas of research that nature–society

and food systems scholars might pursue. First, in-depth qualitative research is needed with both fisher and consumer participants in different CSFs to better understand the perspectives and motivations of each group and to compare experiences across regions and CSF organizational systems. Second, research focusing more closely on the microeconomics of both fisher and consumer decision making could illuminate how these groups are benefiting (or not) from the CSF model. Finally, implications for CSFs in relation to existing and emerging fishery management policies and institutions (e.g., catch shares, sectors, marine spatial planning), as well as growing aquaculture practices, need to be examined. Engaging with these questions will enhance our practical and theoretical understanding of the role CSFs might play in the foodscapes of the future.

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