

Assessing Fish to School Programs at 2 School Districts in Oregon

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Objective: Farm to school (FTS) programs provide many established benefits to students and the community; however, fish to school programs are a less studied subset of FTS. The objective was to identify how fish to school programs are implemented, their impacts, and the enabling factors to support these programs. **Methods:** We conducted formative research and interviewed stakeholders from 2 school districts in Oregon in 2019. **Results:** Interviewees reported benefits of connecting students and the larger school community with local food and creating excitement from new lunch offerings. Factors that facilitated fish to school programs included strong program leaders and partnerships, FTS grant funding, and the creative use of resources. Challenges in maintaining the program included sustainable program funding, seafood distribution networks, recipe development, and higher cost per serving of seafood compared to other proteins. **Conclusions:** Resources exist for school professionals interested in starting or sustaining fish to school programs. These programs are difficult to launch and sustain, and thus, require many forms of support (institutional, financial, industry, culinary, etc) and benefit from innovations like fish to school aggregators and product development such as pre-prepared fish options.

Key words: fish; seafood; farm to school; fish to school; food systems; national school lunch program

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Farm to school (FTS) refers to a suite of programs designed to connect students with their local food system. FTS began in the late 1990s as a grassroots movement that has now spread nationwide¹ and includes activities like school-based procurement of local foods, food and nutrition education, cooking demonstrations and tastings, school gardening, and field trips to farms. The 2015 Farm to School Census found 42% of the 18,000 United States (US) school districts surveyed participate in FTS activities, which reach up to 23.6 million children.² FTS provides a range of health, education, social, and economic benefits to students and their communities.^{2,3} Students eat 33% more fruits and vegetables when they are offered local food as part of the school meal program, and fruit and vegetable consumption triples when students participate in interactive, food-based activities.³ Each dollar spent on FTS activities gen-

erates \$0.60 to \$2.16 of local economic activity, and each new FTS job creates 1.7 additional jobs,³ so these programs have broader impacts on the community.

FTS receives support from the federal government. In 2010, the Healthy, Hunger-Free Kids Act officially established the US Department of Agriculture (USDA) Farm to School Program as part of the National School Lunch Act.¹ Through FTS, the USDA encourages schools to include more *locally* produced foods across all child nutrition programs, such as the National School Lunch Program and School Breakfast Program.¹ School districts are allowed to define the term *local* for themselves, which provides flexibility for each school district depending on their location, culture, and access to local foods; however, the most common way schools define local is sourced from within the state.²¹ School districts can purchase local foods in a variety of

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ways, including directly from farmers or food processors, or from indirect sources like commercial food distributors or USDA foods.²

Our work focuses on the Oregon FTS program. Oregon has supported FTS since 2011 through pilot grant funding and most recently provided \$4.5 million in the 2017-2019 state funding cycle.^{4,5} Oregon FTS grant funding is allocated biannually into non-competitive procurement grants and competitive education grants.^{4,6} The procurement grant is only available to Oregon schools for the purchase of foods grown and processed in-state and for educational activities, while the education grant is open to schools as well as nonprofit organizations and commodity commissions.⁶ Over 130 school districts opted in for the procurement grant from 2017 to 2019, and the Oregon Department of Education awarded 22 organizations with education grants in 2017.^{4,6} Oregon school districts purchased over \$14 million in local food in 2017, which benefited the schools as well as local food producers and distributors.⁷

Oregon and several other coastal states have promoted fish to school programs as a way to engage with FTS while providing regionally, culturally and socially relevant marine-origin food to students.^{8,9} Oregon has a robust commercial fishing industry to support local and national seafood markets. In 2017, the state fishing industry produced a total of \$697.9 million in economic output, was estimated to contribute \$356.2 million in total labor income, and supported the equivalent of 6848 full-year jobs.¹⁰ The key species of Oregon's onshore commercial fishing industry in 2017 were (listed from highest to lowest landed volume): Pacific whiting, groundfish, pink shrimp, Dungeness crab, albacore tuna, other, salmon, and Pacific halibut.¹⁰ There are several seafood commissions managed by the Oregon Department of Agriculture and funded by harvesters and processors to help promote, set policy, fund research, and educate the public about Oregon seafood.^{11,12} Among these commissions, the Oregon Albacore Commission has partnered with school districts to create fish to school programs.

Outside of Oregon, notable fish to school programs include the following: In Sitka, Alaska, local seafood is served to all schools, with school lunch participation increasing on days with local fish on

the menu.¹³ Real Good Fish's Bay2Tray program in Monterey, California, provides northern California students with seafood education and local fish at lunch, like Pacific grenadier, a fish that was previously considered bycatch.¹⁴ High school students in South Philadelphia, Pennsylvania offer a community-based seafood program, Fishadelphia, to connect their larger community to local seafood.¹⁵ New England Farm to School leaders worked together to create a regional Sea to School guide, compiling best practices, resources, and peer case studies for operating a fish to school program.¹⁶ New England also has leveraged community supported fisheries and fishing cooperatives to deliver seafood to schools and other institutions.¹⁶⁻¹⁸ Cape Ann Fresh Catch, located in Gloucester, Massachusetts, is the largest community supported fishery in the nation and delivers fresh seafood to schools, provides training for school food service staff, and offers student taste testing and educational materials.^{17,18} The partnership with Cape Ann Fresh Catch has enabled nearby school districts to expand their fish to school program and serve local seafood every month.¹⁸

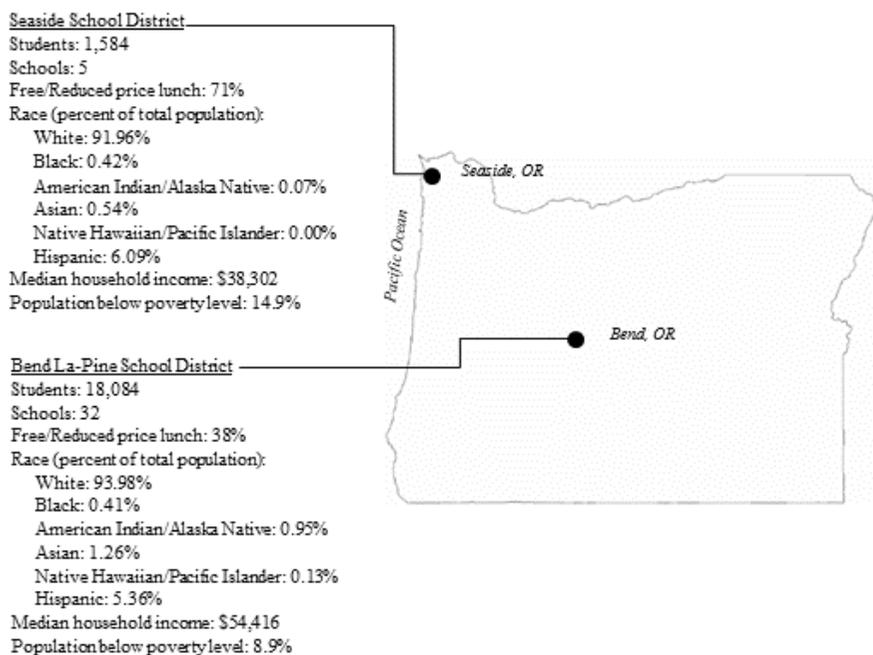
In our review of the literature, we found little documentation of the impacts of fish to school programs beyond a school nutrition perspective. Previous research indicates that participation in FTS programs improves overall academic achievement, school engagement, and knowledge of different aspects of the food system.^{1,3,19} The aim of this study is to investigate 2 fish to school programs in Oregon with a focus on program development. Fish to school programs exist within a larger context where school food managers must be attuned to food product quality, quantity, price, resilience of the supplier, and other dynamics.²⁰ Therefore, we collected data on product flows and cost and social impacts related to student education. The primary research questions we address are: (1) How are fish to school programs created and sustained in Oregon? (2) What enabling factors and interconnections supported the functioning of these programs? and (3) What lessons from these programs can be applied to other fish to school programs in Oregon and other states?

METHODS

Formative Research

Exploratory interviews were conducted with 7

Figure 1
Oregon School District Locations and Profiles Recruited for this Study^{21,22}



individuals including Oregon FTS experts, national fish to school program leaders, and academics who published on FTS topics. These conversations provided information and assisted in developing and refining research questions. During these interviews, several fish to school programs in Oregon were identified as research targets. During formative research, we also collected background information related to the Oregon fishing industry, FTS grant programs, and literature on fish to school programs across the US.

Study Locations

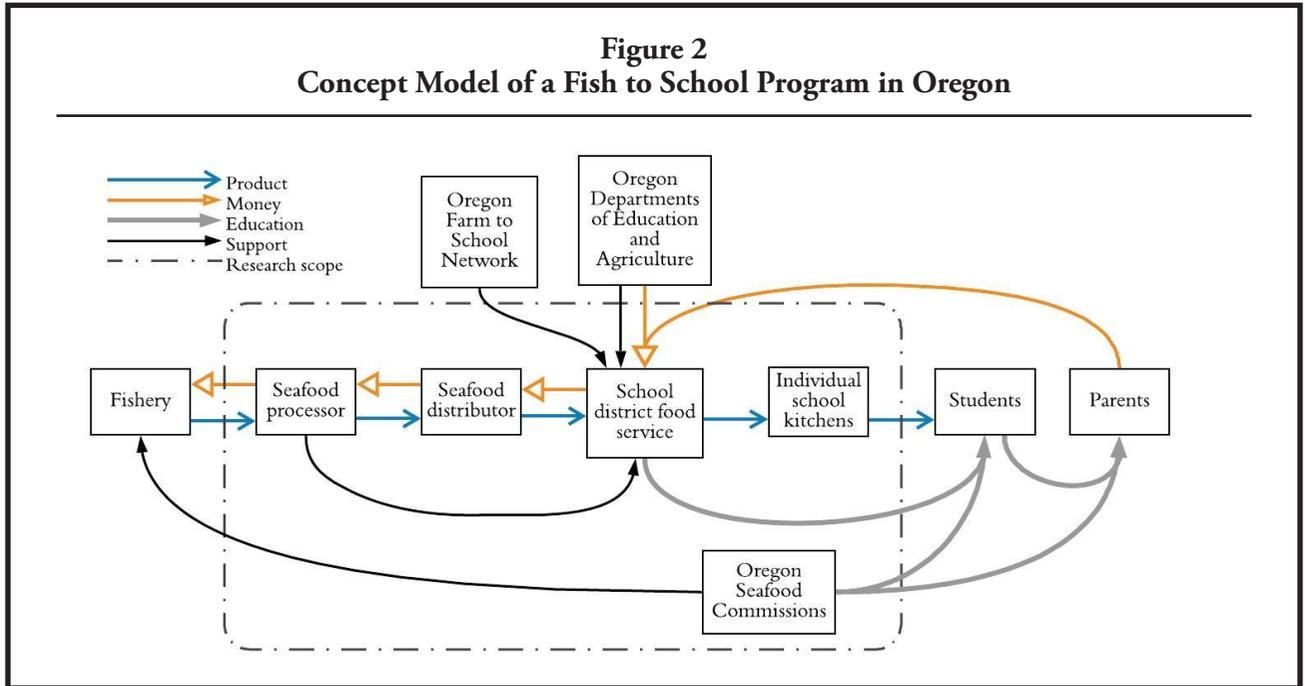
Two Oregon school districts, Bend-LaPine and Seaside, were identified as districts that exemplified a fish to school program in the state. The Bend-LaPine School District oversees 32 schools and 18,000 students in the inland city of Bend, Oregon (population 98,000), and the Seaside School District manages 5 schools and 1500 students in the coastal town of Seaside, Oregon (population 6700) (Figure 1).²¹ The median household income is lower and the proportion of students on free and reduced lunch is significantly higher in Seaside compared to

Bend-LaPine (Figure 1).^{21,22} Both school districts are majority white and have similar racial demographics.²² The school districts both have seafood related student education and serve local seafood in their cafeterias. Other Oregon school districts were not a good fit with this research because of their location or limited capacity to source local seafood and provide student education.

Interview Guide

We developed an interview guide after reviewing previous farm to school studies^{23,24} and from background information gathered during the exploratory interviews. Questions were developed to address the fish to school program system and its related actors, interactions, and effects. The scope was limited to how participants interact to create a fish to school program, including the product flows, economic impacts, and social impacts related to student education. The questions are presented in Appendix 1. We created the concept model of a fish to school program system in Oregon based on our formative research and previous work by others²⁰ (Figure 2).

Figure 2
Concept Model of a Fish to School Program in Oregon



Recruitment

Interviewees were selected by their participation in the fish to school program at either Bend-LaPine or Seaside school districts, and their fit within the scope of our concept model. Each participant was contacted by email with information about the research project and to request an interview. Interviews were then scheduled and conducted by phone.

Data Collection

We conducted 6 interviews between May 2019 and June 2019. The interviewees included seafood processors, Oregon seafood commission leaders, school district food service leaders, and school kitchen managers. We did not interview students. We used the same list of questions for all participants; however, we asked specific follow-up questions to gather more detailed information as needed. We took notes during the interviews, and recorded the interviews to enable transcription accuracy. We gathered additional follow-up information by email as needed.

Data Analysis

Interview responses were analyzed using Excel (Microsoft, Redmond, WA). The responses were or-

ganized around 5 pre-determined topic areas: initiation (including both orientation and interactions/cooperation), product flow, economic impact, social impact, and enabling factors. For the economic impact, we analyzed price data and determined a reference price (ie, the price of seafood that schools could afford without the assistance of FTS grant funds) from interviews with the seafood processor. Prices from the purchases made with FTS grant funds were compared to the reference price as a percentage increase and weighted based on the amount of seafood purchased. The weighted percentage increase was calculated by multiplying the percent increase of each seafood product to the reference price by the pounds of the seafood product purchased, then dividing by the total pounds of seafood purchased within that school year for each school district. The average weighted percentage increase was then calculated for each school year at each school district. The enabling factors were further categorized as benefits, facilitators, and challenges.

RESULTS

Bend-LaPine School District

Bend-LaPine was the first school district in the state to have a fish to school program, which began in the 2012-2013 school year. The program includes both an educational component and a

school lunch component. Several species of seafood are procured by the food service department and are incorporated into the school lunch menu throughout the year. Bend-LaPine also organizes a fish to school day and invites members from the Oregon Trawl Commission, an association that supports research into the harvesting, processing, and marketing of Oregon trawl-caught seafood,¹² to visit the school and present to fifth- and sixth-grade students.

The Bend-LaPine fish to school program began as a conversation between the Oregon Department of Agriculture and a wellness specialist at the school district. The wellness specialist worked with the Oregon Department of Education to apply for and obtain a FTS grant. Separately, with help from a FoodCorps fellow and the Oregon Trawl Commission, Bend-LaPine connected with an Oregon seafood processor, Bornstein Seafoods. The school district worked directly with the processor to procure their seafood. Bornstein Seafoods is a family-owned company with multiple operations along the coast of Oregon and Washington.²⁵ Their primary processing plant is located in Astoria, Oregon,²⁵ which is approximately 260 miles from the Bend-LaPine School District. Bornstein Seafoods managed the logistics of identifying appropriate seafood species at a price point that the school district could afford. In their first year of operating the fish to school program, Bend-LaPine organized for 6 different seafood species to be transported by Bornstein to their meat supplier, who then transported the seafood to Bend-LaPine on their trucks. However, most recently, a Bend-LaPine employee volunteered to pick up their seafood order from Bornstein and stored the food in Bend-LaPine's industrial freezers to use throughout the school year.

Bend-LaPine has an executive chef on staff who created several different kid-friendly seafood recipes that were compliant with National School Lunch Program regulations. These recipes included shrimp fettucine, blackened salmon tacos, shrimp salad, and tuna marinated in ginger-soy sauce. Bend-LaPine now incorporates pink shrimp into their weekly menu through a pasta bar and shrimp sushi.

Seaside School District

The Seaside fish to school program started in the 2016-2017 school year with an educational grant

awarded by the state to the Oregon Albacore Commission. The Commission chose to work with Seaside School District because the community lacked the resources needed to access local seafood, and the Commission had an existing connection to the school district. The executive director of the Oregon Albacore Commission worked with a fellow commissioner to create the program, a retired fifth-grade teacher who developed the curriculum, and fishers to organize presentations for the students. Five fifth-grade classrooms (~ 150 students in total) participated in the educational aspect of the fish to school program. The Seaside food service director used separate FTS funds to procure local fish that was served to all schools on their lunch menu. Seaside also has a culinary arts program of about 20 high school students that contributed to both programs.

Seaside School District's food service director worked with the school district to obtain approval to purchase local seafood as part of the National School Lunch Program. As Seaside is managed by a food service management company, they also involved their regional executive chef and procurement manager to identify appropriate recipes and procurement policies. Like Bend-LaPine, the food service director worked with Bornstein Seafoods to determine which fish they could purchase, as well as with the Oregon Department of Education to identify how much grant funding was available and to ensure their recipe was National School Lunch Program compliant. Seaside's culinary arts program instructor worked with the food service staff to prepare the school lunch meals, such as rockfish tacos that were adapted from an existing school lunch recipe. The fish was steamed by the culinary students, then transported to the high school to be used in tacos for lunch service. Rockfish tacos also were served to the middle school and 2 elementary schools on their designated fish to school lunch day.

Food Expenditures

Table 1 presents the cost and quantity of seafood acquired by each school district. Bend-LaPine spent \$41,500 on 9300 pounds of seafood over the study period from 2012 to 2019 (Table 1). In the first year of the program (the 2012-2013 school year), Bend-LaPine received a FTS procurement grant for \$27,000 and about 90% of the grant was used

Table 1
Seafood Purchases by School District and Year

School District (school year)	Fish Species	Amount (lbs)	Price per pound	% Increase over base price ^a (\$2.56/lb)	% Increase (weighted by amount in lbs)	Total cost
Bend-LaPine						
2012-2013	Pink shrimp	3000	\$3.50	37%	19%	\$10,500
	Dover sole	1060	\$3.50	37%	7%	\$3,710
	Rockfish	1000	\$2.95	15%	3%	\$2,950
	Tuna loin	750	\$7.50	193%	25%	\$5,625
	Dungeness crab	50	\$20.50	701%	6%	\$1,025
	King salmon	32	\$15.20	494%	3%	\$486
	Total	5892			61%	\$24,296
2014-2015	Pink shrimp	2000	\$3.50	37%	23%	\$7,000
	Tuna and salmon	1250	\$7.33	186%	72%	\$9,160
	Total	3250			94%	\$16,160
2016-2017	Pink shrimp	200	\$5.25	105%	105%	\$1,050
Seaside						
2018-2019^b	Rockfish	48	\$3.10	21%	21%	\$150

Note.

^a \$2.56/lb was considered a base price for an affordable seafood option that fits within the cost of \$0.30 to \$0.40 per M/MA

^b not funded by a farm to school grant

to purchase 5000 pounds of seafood. This seafood purchase was served in the cafés of 27 Bend-LaPine schools over 4 months, offering at least one seafood option every day. The remaining funds were spent for educational purposes, including marketing materials, newsletters, and classroom education initiatives, such as the travel costs of seafood industry professionals who traveled to Bend-LaPine for classroom education. In the 2014-2015 school year, Bend-LaPine purchased 3250 pounds of shrimp, salmon, and albacore tuna using FTS grant funding. In the 2018-2019 school year, 200 pounds of pink shrimp were purchased without the FTS grant.

Seaside School District used \$150 of their FTS procurement grant to purchase 50 pounds of rockfish from Bornstein Seafoods, whose facility is located less than 20 miles from the school. The rockfish was sold to the school district at \$3.10 per pound (Table 1). Their food service director drove to Bornstein to pick up their 50-pound order of rockfish fillets and transported it to the school

kitchens for cold storage. Separately from the FTS seafood procurement grant, the Oregon Albacore Commission was awarded a \$15,400 FTS education grant. This was used to provide fish-specific activity books, fishers’ presentations, culinary events, presentations that focused on a different seafood species each month, and a field trip for the 5 fifth-grade classes. The Seaside educational program also provided take-home dinner kits for the students and their families. These kits contained the ingredients to produce a seafood recipe, like salmon burgers and tuna pasta salad.

Participants in our study reported they had about one dollar per person to spend on school lunch meals. Seaside school district reported spending around \$0.30 to \$0.40 per meat/meat alternates (M/MA) (eg, \$0.30 per 2 ounces of deli ham, \$0.31 per beef patty, \$0.39 per chicken patty). Bornstein, the seafood processor for both schools, uses \$0.16 per ounce or \$2.56 per pound as a price point that matched the cost of other M/MA foods.

However, Table 1 reports, the price of seafood was 15% to 500% above what school districts could afford. Therefore, the FTS grant program allowed the schools to increase their per-pound purchase price for seafood by a weighted average of 61% for Bend-LaPine during school year 2012-2013, 94% for Bend-LaPine during school year 2014-2015, and 21% for Seaside during school year 2016-2017 (Table 1).

To serve the school districts better, Bornstein separated smaller fish fillets and shrimp from their market pack sizes. This provided a more consistent 2-ounce fish fillet for the schools and also created a better standard pack size for the processor's commercial customers as it eliminated the smaller fish fillets. Removing smaller shrimp from the marketed pack allowed Bornstein to sell their products for an additional dollar per pound. The seafood processor noted that due to the large amount of products they process, the seafood sold to the school districts was not a large source of revenue. Additionally, the seafood processor commented that it is a balancing act to determine what seafood can be purchased with the FTS funding as seafood prices change.

Social Impacts of Fish to School Programs

The participants in both school districts reported that educational programs were well received by the school community. All stakeholders reported positive impacts from the program. Students at each school district were described as engaged and excited to learn about seafood and to try a new and interesting lunch item. Bend-LaPine's wellness specialist stated that the students were "excited to see what new and exciting recipes our chef comes up with using local ingredients." The Seaside food service director recalled that students "were so excited [about the program] and it was something that they would talk all day about."

Students received a comprehensive perspective on the seafood industry by learning directly from fishers, holding whole fish, interacting with equipment such as nets and crab pots, and finally tasting the seafood in the café. The fisherman was "amazed at the quality of the questions" the students asked. A Seaside school food manager thought serving local seafood in the café was "new and special" for the students but if they "could have it more often it would be more impactful."

Overall, stakeholders perceived that the students increased their knowledge of seafood through the program. Receiving education on the fish through presentations by experts in the field was a fun and interactive way for students to learn more about local seafood and generate interest in the industry. The Seaside food service director thought that having both education programming and serving local seafood in the café "helps [students] with the connection, bringing everything full circle." One interviewee commented that as many as one-third of the Seaside students raised their hands when asked if they were related to or knew someone who had a connection to the seafood industry. The seafood industry leaders stated that learning what the students are interested in is important to them as students are their future consumers and can help shape the future of the seafood industry. The seafood processor mentioned that "it's fun to learn what [the students are] interested in and it's fun to learn what's important to them because it really does help us shape the future of what our fisheries look like in some cases, because you find out what they're interested in and it gives you a chance to talk about what you're doing right."

The Seaside program leaders received positive feedback from parents, who appreciated connecting classroom learning to their homes. Additionally, the program leaders noted that the seafood education affected the teachers. The seafood processor perceived that the educational activities changed how teachers view the fishing community after observing how many students have a connection to the industry. She recalled that "it helped [teachers] to realize that the program was important for their classrooms and it is important in their communities and I think it made in some ways commercial fishing more tangible." Excitement was noted among the entire school community. The fisherman perceived that the program "makes a very large impact in terms of school and in terms of community" and was "very excited about it, hoping [the program] would take off and be more than just the Seaside fifth grade, to branch out to so many other areas."

Both the Seaside and Bend-LaPine programs generated positive media attention. The Seaside education program was featured on a local news channel and by a popular Oregon television series, *Grant's Getaways*.

Enabling Factors

In general, the interviewees considered the fish to school program to have performed successfully. They thought that fish to school programs are scalable and could be expanded to more districts. We noted several benefits, facilitators, and challenges facing these types of programs.

Benefits. As noted, the fish to school programs in both school districts created excitement in the school community and created connections with students, teachers, and parents. The school districts offered new lunch menu items that were positively received by students. Seaside also noted that they have put more fish in general, like canned tuna, on their menu since offering rockfish to the students. Larger community connections were also created by bringing fishery representatives to meet the students. The seafood industry leaders appreciated the opportunity to share their profession with students. The seafood processor reported that the fish to school program gave them new options to improve their product, such as creating more standard pack sizes. Additionally, the processor could market to their customers that they were helping school districts, creating a feeling of goodwill.

Facilitators. Besides the FTS grant funding, which was key in acquiring seafood and in funding educational activities, stakeholders in Oregon reported that establishing diverse partnerships was essential to the success of the program. The partnerships were described as passionate, committed, and instrumental. Partners included seafood experts from commissions, the Oregon Departments of Education and Agriculture, culinary personnel either within or outside of the school district, and the seafood processor.

The seafood processor representative was a key stakeholder who organized the logistics of procuring seafood and worked with each school district to identify appropriate products that could meet their needs. The Seaside food service director noted that “the people at Bornstein’s were probably the biggest help” in participating in the program. Additionally, the seafood processor thought that it was helpful that Oregon has multiple seafood commissions that the processor could connect and collaborate with on the FTS grant application. At Bend-LaPine it was beneficial to have a chef on-site who could create several appealing and compliant

recipes for students.

In terms of education, both Oregon programs were able to find teachers who were willing to have their class participate in the program. Seaside appreciated the role teachers played in the educational component. As the fishers presented to the students only once per month for one hour, the fisherman commended the teachers who “carried the program on, talking about it throughout the year.”

Lastly, having motivated and passionate program leaders at the school was a requisite step noted by interviewees in starting the program. Each school district had a dedicated program champion. Their responsibilities included applying for FTS grant funding, connecting with key stakeholders, organizing the distribution of the seafood product, and providing opportunities for students through either café recipes or educational presentations. These leaders each have an inherent interest in serving local seafood to schools and were instrumental in starting the fish to school program.

Challenges. The common challenges noted among all stakeholders were maintaining sustainable funding sources and developing kid-friendly, compliant recipes. Bend-LaPine has continued to purchase pink shrimp without grant funds but has not been able to purchase as much diverse seafood products as they were able to with the assistance of the grant. The Bend-LaPine wellness specialist commented that with “the opportunity to have more funding... the potential is greater that we will continue to offer new and exciting items” to students. Seaside does not currently serve any fresh fish but is located where there is an abundance of fresh seafood that is cost-prohibitive, such as Dungeness crab and albacore tuna. The education piece of the fish to school program also appears to be dependent on grant funds. Neither school district has continued their educational programming without grant funding.

Recipe development and production were identified as challenges. The seafood processor representative noted that food service staff were concerned about allergens when working with raw fish. Seaside was challenged by finding a recipe that students liked and that was compliant with the National School Lunch Program. The Seaside school food manager noted that training would be needed to prepare raw seafood for future recipes; recipes that

required little cooking were preferred. Conversely, Bend-LaPine attributed their initial program success to the recipe development by their executive chef. Seaside also reported that because their food service program is managed by a food service management company, working through the procurement policies was challenging until Bornstein was established as a qualified vendor.

DISCUSSION

This study analyzed 2 fish to school programs in Oregon and found that these programs were facilitated by strong program leaders and partnerships, FTS grant funding, and the creative use of resources. Oregon has a robust commercial fishing industry and an established seafood procurement network, but these alone are not sufficient to support fish to school programs. The high cost of seafood means that school districts need to subsidize local seafood purchases using grants or state FTS funds. In addition, school districts may need to develop recipes for new seafood menu items and educational material to support the program, which have been noted by other FTS studies.^{23,26} These programs also require contributing factors such as established program leaders or champions, diverse partnerships, and creative use of resources.^{19,26,27} Notwithstanding these hurdles, the fish to school programs we assessed appeared to be a net positive and were well received by the students, school community, and seafood industry.

One key finding was related to the cost of seafood, which is an important factor to consider as schools budget for the 5 food components of the National School Lunch Program.^{28,29} The 5 meal components at lunch are meat/meat alternates (M/MA), whole grain rich foods, vegetables, fruit, and milk.^{28,29} The students' grade group determines the portion size for each food group.²⁸ For example, students in grades K-8 and 9-12 must be served 1 ounce and 2 ounce-equivalents of M/MA, respectively. Two ounce-equivalents of M/MA could be a 2-ounce fish fillet, 2 sticks of string cheese, a half cup of drained beans, or a 2-ounce-equivalent combination of cheese and meat on a slice of pizza. School districts wishing to incorporate local seafood into school meals must still comply with specific government regulations for meal programs related to the types and quantities of food.²⁹ Overall food spending at the school

districts in our study agrees with reported national estimates where a 2-ounce-equivalent serving of M/MA was around \$0.30 for an affordable option like chicken nuggets and \$0.50 for a more expensive option like vegetable bean chili.³⁰ Seafood, however, can be considerably more expensive than other protein options (for example, \$0.19/oz to \$0.95/oz for fish). Others have found the main reason schools do not embrace FTS programs is because of cost.¹⁹ This includes the increased cost for local foods, labor in training staff and preparing raw foods, and new billing and distribution.¹⁹ Grant funding allows schools to expand their local seafood offerings in both variety and frequency.²³ These findings were echoed by the stakeholders in our study.

Schools engaged in fish to school programs, need support from diverse groups and may consider establishing a network for local seafood. A fish to school aggregator, like a fishery cooperative or community supported fishery, can help promote cooperation among stakeholders and improve the resilience of fish to school programs.³¹ This is similar to the programs in New England where these entities help manage seafood distribution, culinary training, and promotional materials.^{16,17} Identifying an aggregator would ease the burden on school district leaders in procuring seafood. This would also benefit the local seafood industry by improving markets for lesser known seafood species, like groundfish,^{14,32,33} and potentially expanding product sales to more school districts.

Another key finding relates to social impacts of fish to school programs. Studies have shown FTS programs have positive social impacts, including engaging students, increasing student knowledge, connecting food in the café to the community, and creating inter-organizational relationships.^{3,19,23,26,27} Similar findings were reported by the participants in this study, highlighting the positive effect of connecting directly with students and subsequent advantages of increasing student knowledge and engagement. Whereas current literature emphasizes the impact FTS programs have on children and the community, there are fewer reports of the impacts on program leaders. In this study, participants reflected on how the program personally affected them in addition to the larger community, reporting the fish to school program as a positive experience and their desire to carry on the program.

There were several limitations to this study. First, the interviews were conducted at a single point in time and do not reflect longitudinal trends. The scope of the interviews was limited to certain participants, and did not include fishers, students, or parents. Another limitation was the small sample size (7 participants) over 2 school districts. Neither program completed formal evaluations for student participation, engagement, or knowledge; thus, our results are based off the observations and perceptions of the stakeholders. Lastly, we did not perform a formal program evaluation of either school district, which would provide a more robust assessment.

Conclusions

FTS has documented a wide range of benefits for students and their communities.^{2,3} There is a growing list of fish to school programs across the country. The state of Oregon provides funding for FTS including for purchasing local seafood. Bend-LaPine school district is the first and longest running fish to school program in the state and has successfully found ways to sustain the program. Interviews with participants engaged with the Bend-LaPine and Seaside school districts provide evidence, enabling factors, and practical advice on how to establish other fish to school programs in Oregon and nationally. Our findings from 2 school districts in Oregon should be transferable to other communities and school districts with access to local seafood.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

Access to healthy foods is a goal of *Healthy People 2020*³⁴ and our work relates to this key issue by providing students with local fish, a food item that our stakeholders reported students having little access to due to affordability or availability. Additionally, serving local food can increase fruit and vegetable consumption,³ objectives of the Nutrition and Weight Status goal of *Healthy People 2020*.³⁵

Schools districts interested in sourcing local seafood will need to consider recipe and product development for school meals during program scoping. Having a product that is easy to prepare with little cooking is preferable, for example, a pre-cooked fish product at an affordable price would be

important to identify. However, if pre-cooked fish products are not available, they may need to acquire the culinary resources and appropriate kitchen equipment to satisfactorily prepare raw seafood. Practitioners may want to review the findings of the USDA Food Promotion Program Implementation grant that is currently supporting work in the Pacific Northwest to create more school-ready seafood products and recipes.³⁶

Fish to school program practitioners should connect and build relationships with stakeholders in their region, such as a seafood processor, school district food procurement specialist, school nutritionist, or teacher. Finding program champions who are passionate, resourceful, and creative will help the fish to school program succeed long-term. Networking with other school districts within the state and around the country that are active in fish to school programs will help in knowledge sharing and troubleshooting.

Lastly, identifying sustainable funding options is critical. The cost of local seafood often necessitates that these foods are subsidized by outside funding, such as through state FTS legislature. This may require some creativity on the part of the procurement department and/or school nutritionist to create meals that fit per student M/MA price points. Fish does not have to be on the menu daily or weekly to derive benefits from the program, so there are options to provide seafood on a more limited basis if funding is a constraint. In any case, policymakers should continue to support FTS legislature and funding to uphold FTS programming in schools.

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Human Subjects Approval Statement

The study was reviewed by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and determined to be not human subjects research.

Conflict of Interest Disclosure Statement

All authors of this article declare they have no conflicts of interest.

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Appendix 1
Research Foci and Interview Questions with School
Food Service and Seafood Industry Leaders

Research Foci	Interview Question
Orientation	What’s your role and history with the boat to school program?
Interactions/ Cooperation	Who are the other boat to school program stakeholders that you work with? In what capacity do you work with them?
Product flow	How much fish do you sell/buy for the boat to school program (processed weight)? How do you process the fish for the boat to school program, from the time it is received through when you distribute it?
Economic impact	At what price point do you sell/buy the fish for the boat to school program? What percent of sales/food cost is from the boat to school program in your business?
Social impact	How has participation in the boat to school program impacted you and your business? How has participation in the boat to school program impacted your relationship with students? What impact does the boat to school program have on students’ education?
Enabling factors	How do you think the boat to school program is performing? What are the biggest challenges of participating in the boat to school program? What has helped or deterred you in your role to participate in the boat to school program? Do you think the boat to school program is scalable/can be expanded to more districts? Why or why not? What advice do you have for your counterparts wanting to participate in a boat to school program?

Note.

The term “boat to school” is interchangeable with “fish to school” and Oregon’s designated term for the program.