Sustainable, Locally Harvested Seafood in Hawai‘i School Food Programs

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Abstract

Due to its geographic isolation, Hawai‘i imports 85% of its food supply leaving its population vulnerable to supply chain disruptions. Our project goal was to work with NOAA and Conservation International Hawai‘i to investigate the viability of integrating sustainable, locally caught seafood into Hawai‘i school lunches, contributing to the state’s self-sufficiency, promotion of sustainable food production, and support of local industry. Using interviews, we evaluated potential supply chains and distribution methods and assessed existing sustainable food programs. After analyzing our results, we made recommendations regarding program-compatible supplies and distribution systems, program design and implementation strategies, and project collaboration with the school district.

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Authorship

The contents of this report are a result of the collaboration among all authors. Since we completed all writing and editing together, we all take equal authorship of all sections of this report. The views and opinions expressed in this analysis are those of the authors and do not necessarily reflect the official policy or position of the U.S. government, NOAA, or Conservation International Hawai‘i.

Executive Summary

Before Western contact, the people of Hawai‘i were self-sufficient, producing all the resources they needed to thrive. The state's history of cultural changes, economic shifts, environmental degradation, and population growth has forced Hawaii's current population to rely heavily on externally sourced food supplies. However, Hawaii's isolated island geography makes this procurement system precarious, leaving the state vulnerable to food shortages during unpredicted supply chain disruptions (Pollard et al., 2014). There have been efforts within the Hawai‘i State Legislature to promote local food production and mitigate the risk of shortages. Senate Bill 376 (SB 376) establishes plans and allocates funds to support Hawaii's ‘Aina Pono ‘Farm to School' program and increase the amount of locally sourced food used in school food programs. While there have been several successful initiatives under SB 376 to get fresh produce in local Hawai‘i schools, there have currently been no attempts to adapt these programs to supply Hawai‘i schools with fresh, local seafood.

The goal of this project was to work with our partners at the National Oceanic and Atmospheric Administration (NOAA) and Conservation International Hawai‘i (CI Hawai‘i) to investigate the viability of integrating sustainable, locally caught seafood into Hawai‘i school lunches. This was done with the intention of contributing to the state's self-sufficiency, promoting sustainable food production, and supporting the local fishing industry. In this investigation, we had two objectives.

Our first objective was to evaluate Hawaii's fishery supply chain dynamics and existing distribution systems to identify potential options for supplying fresh fish to local school systems. To fulfill this objective, we conducted semi-structured interviews with distributors, management specialists, and other experts involved in Hawaii's fishery supply chain.

From these interviews, we gained a comprehensive understanding of Hawaii's local fishery supply chain operations, including different local seafood procurement strategies, the processing and distribution infrastructure, and the local supply and demand dynamics. The consensus gathered was that a limiting factor for getting fresh locally sourced seafood into Hawai‘i schools is competition with tourists, who can afford high-quality products. Instead, our interviewees suggested that commercial bycatch or farm-raised seafood could be more financially viable for a school lunch program. Many experts suggested tilapia could be a good fit

for a school lunch program due to its ability to be reliably and abundantly produced, at low costs. Another obstacle that emerged from many of our interviews is that Hawai‘i lacks the local processing and distribution infrastructure to accommodate the demand of the Hawai‘i school district to compete with the offshore suppliers. The most attractive distributors to the Hawai‘i Department of Education (HIDOE) are those that can reliably supply a product that is already processed and packaged. While some seafood distribution companies are conducting processing operations locally, the majority are either not doing so or are in the very early developmental stages and are not operating on a scale compatible with HIDOE contract conventions.

Our second objective was to assess existing sustainable school food programs to identify features of a successful program and strategies for implementation. To fulfill this objective, we conducted semi-structured interviews with sustainable food program initiative specialists and individuals from school communities with insight into the school food service operations and the logistics of how a ‘sea to school’ program could fit into these systems.

From the information gathered from our interviews for objective two, we identified four key features that characterize a successful ‘sea to school’ lunch program in Hawai‘i. These include compatibility with HIDOE regulations and food safety standards, a reliable supply of local seafood products, properly equipped kitchen facilities with suitably trained staff, and positive school community engagement. In this investigation, we also identified and spoke with representatives from various organizations that are either already working on ‘farm to school’ projects in Hawai‘i or have expressed interest in similar projects. One notable local organization that has already invested resources in working with the Hawai‘i School Food Services Branch is Kunia Country Farms, an aquaponics company on O‘ahu. In our interview, the co-founder, Jason Brand, described plans to expand the company and work on creating and expanding the production of a local seafood product compatible with HIDOE procurement policies.

The information that we compiled from the interviews informed the recommendations we provided for our project partners at NOAA and CI Hawai‘i to facilitate the implementation of a ‘sea to school’ program in Hawai‘i. For local food supplies, we recommend utilizing alternative seafood products from commercial bycatch or aquaculture and encourage further collaboration with Jason Brand at Kunia Country Farms, as he has expressed interest in a ‘sea to school’ project. Additionally, we recommend that efforts be made to invest in local production of ready-to-bake seafood products to accommodate school kitchen equipment limitations and staff skill

levels. For program design strategies, we recommend developing complementary agricultural literacy curricula and educational materials that are accessible and easy for schools to incorporate. Additionally, we encourage investment in kitchen staff training. To facilitate the successful implementation of the program, we recommend getting various members of the school community involved in the program, as much as possible.

Figure 1: Photo of the Lettuce Planters at Kunia Country Farms

Note: Taken during a tour of the Kunia Country Farms facility.

Since all of these program measures will need to be approved by HIDOE and the State Procurement and Contracts teams, we recommend creating a formal mechanism for regular collaboration between HIDOE and other organizations with a vested interest in increasing locally sourced fresh ingredients in Hawai‘i public schools. To do this, we propose establishing a dedicated ‘sea to school’ task force with representatives from both within and external to HIDOE who will work collaboratively towards this common goal. We recommend that this task force considers subdividing the Hawai‘i school district into smaller subdistricts and reevaluates the current HIDOE bidding procurement policies to prioritize smaller localized supplier contracts.

Our team identified potential barriers to implementing a successful ‘sea to school’ program in Hawai‘i and developed recommendations in putting this program into action. Although we have identified significant obstacles in implementing a ‘sea to school’ program in Hawai‘i, we found some surprising assets that could make such a program viable. We recognize there may be similar efforts or processes occurring on the neighboring islands that could support this initiative. We aspire that our project results and recommendations will direct a relevant audience to continue this work towards implementing a ‘sea to school’ program in Hawai‘i.

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1. Introduction

The Hawaiian Islands are a chain of volcanic islands located about 2,500 miles from the United States mainland in the central Pacific Ocean. The island's diverse ecosystems and abundant natural resources enabled Polynesian settlers, who first migrated to the islands in 400 CE, to sustain themselves for centuries independent of external influence (Laudan, 2016). However, contact with Western explorers in the late 18th century initiated a period of acculturation that had profound influences on the Hawaiian population. The following years of cultural change, economic shifts, environmental asset abuse, and population growth resulted in a local food demand that could not be satisfied by local production alone (Laudan, 2016). Today, Hawai‘i imports approximately 85% of its food supply, leaving the state vulnerable to supply chain disruptions (Kittinger et al., 2018; Pollard et al., 2014). Additionally, shipping, processing, and storing imported goods significantly increases the cost of food, making high-quality food less accessible to lower-income families (Heinrich et al., 2008).

The Hawai‘i state government has recognized these deficiencies, responding with several initiatives to amend Hawaii's food procurement systems and promoting self-sufficiency by investing in local food production. The passing of Senate Bill 376 in 2015 established and allocated funds for a ‘farm to school’ program in the Hawai‘i school district and a Farm to School Coordinator position in the Hawai‘i Department of Education to manage its operations (HI State Legislature, 2015). This bill prompted the design and implementation of the ‘Aina Pono ‘Farm to School’ initiative in Hawai‘i, incorporating more locally sourced food ingredients in school lunch menus (HIDOE, n.d.a). This initiative was bolstered by the passing of House Bill 767 in 2021, which transferred the Hawai‘i ‘farm to school’ program from the Department of Agriculture to the Department of Education and defined the goal that at least 30% of the food served in public schools will be locally sourced by the year 2030 (HI State Legislature, 2021).

The most notable success of the ‘Aina Pono initiative is the pilot ‘farm to school’ program at Mililani High School, which has succeeded in tripling the use of locally sourced fresh produce in its cafeteria menu (Hawai‘i SFSB, 2019). However, to date, there have been no attempts to adapt this program to utilize Hawaii’s local seafood production as a resource for school food supplies. As such, the goal of this project is to investigate the viability of designing and implementing a ‘sea to school’ lunch program in Hawai‘i, which would integrate sustainable, locally caught seafood into school lunches.

2. Background

In this chapter, we start by discussing both the locally produced and imported food supplies that are currently available to be used by the state of Hawai‘i. We highlight the history and limitations of local agriculture and seafood production and how this has resulted in state dependence on imported goods. Next, we outline Hawaii's current school food services and lunch program operations, including the Hawai‘i Department of Education's (HIDOE) food procurement policies and the progress that the ‘Aina Pono program has made towards reaching the ‘30% local by 2030' program goal.

2.1. Hawaii's available food commodities

In this section, we examine each of the different food supply lines in Hawai‘i, including local agricultural production, local seafood production, and imported offshore-supplies. In this examination, we offer historical context and the economic factors that have impacted the accessibility of these options in Hawai‘i.

2.1.1. Local agricultural production

The prolific coastal landscape and fertile, nitrogen-rich soil of the Hawaiian Islands have supported successful agricultural production by island populations for centuries (Tilling et al., 1987). While pre-contact Native Hawaiian populations engaged in exclusively subsistence agriculture, contact with western civilization followed by centuries of immigration eventually led to the commercialization of Hawai‘i agriculture and the economic subjection of Hawaii's labor force to wealthy white plantation owners (Laudan, 2016; O'Connor, 2008). This history is closely tied to the modern Hawai‘i sociocultural identity and has had lasting impacts on the economic prowess of modern day agrofood industries in Hawai‘i.

The agrarian sector of Hawaii's economy has been deteriorating since the mid-twentieth century, which has cultivated an economic framework that does not support agricultural production for local consumption (Suryanata, 2002). These circumstances are largely a consequence of Hawaii's island geography (Suryanata, 2002). The geographic isolation of the Hawaiian Islands often prevents farmers from being able to sell locally grown staple crops, such as vegetables, in external markets due to the increased costs associated with shipping (Suryanata, 2002). This inability to compete in the global agrofood industry can be challenging for Hawaii's farmers when local production exceeds the demand of local markets and they have no outlet to

sell their surplus product (Peters et al., 1954; Suryanata, 2002). Any variability in production that under- or over-saturates the local market can cause major fluctuations in the price of food (Peters et al., 1954; Suryanata, 2002). This inconsistency can make it challenging for Hawai‘i farmers to do business with local wholesalers and supermarkets that prefer the reliable supply and stable pricing of imported products from distributors on the U.S. mainland (Suryanata, 2002). As a result, the state of Hawai‘i relies heavily on imported food supplies to compensate for the limited capacity for local agricultural production to compete in local or global agrofood industries (Suryanata, 2002).

2.1.2. Local Seafood Production

Seafood has always been an important component of the Hawaiian diet. Pre-contact Native Hawaiians were skilled fishermen and were able to sustainably catch fish for centuries using netting and hook and line fishing techniques, as well as cultivating fish in sophisticated sea and freshwater fishponds (Laudan, 2016). These indigenous populations had a thorough understanding of the island's coastal ecology and were able to capture a wide variety of fish, including nearshore, reef, and deepwater bottom fish such as ‘opakapaka and ahi (Petterson et al., 2012). These production techniques continued to be used for centuries until European colonists arrived in Hawai‘i, bringing with them their own fishing techniques (Laudan, 2016; O'Connor, 2008). In the decades following that initial contact, the conservative Native Hawaiian fishing techniques were neglected in favor of large-scale commercial fishing methods, and Hawai‘i was introduced into the global fishing industry (Laudan, 2016).

Since the nineteenth century and through the mid-twentieth century, unsustainable fishing techniques threatened global fisheries, which had a significant impact on local fish production in Hawai‘i (National Geographic, 2010). However, since then, fishery management efforts have improved, and regulatory policies such as the 1976 Magnuson-Stevens Fishery Conservation and Management Act have helped to restore U.S fisheries and promote more sustainable fishing practices (NOAA Fisheries, 2021b; NOAA Fisheries, n.d.a). These regulatory policies have enforced catch limits for threatened fish species, designated protected areas to promote ecosystem rehabilitation, and developed accountability measures such as gear restrictions and onboard observers to ensure fishing operations are being performed responsibly (Fisheries in the Western Pacific, 2010). As a result of these efforts, Hawai‘i has made significant progress towards restoring its ocean ecosystems and today Hawaii's local fisheries are producing some of

the highest quality seafood in the United States (Loke et al., 2012a; NOAA Fisheries, 2021a). Local seafood production in Hawai‘i consists of commercial landings, which mostly include species such as bigeye tuna, yellowfin tuna and other pelagic fish, non-commercial catch which mostly includes yellowfin tuna and mahi mahi, and aquaculture production which mostly includes shellfish and finfish (Loke et al., 2012a).

However, despite producing some of the highest quality fish in the United States, the volume of seafood landed in Hawai‘i is much lower than other U.S. fisheries (Loke et al., 2012a; NOAA Fisheries, 2021a). Hawaii's large population of Asian and Pacific Islander residents, combined with the tourist demand, produce a per capita seafood consumption rate in Hawai‘i that is significantly higher than the average nationwide rates (Suryanata & Umemoto, 2001; Loke et al., 2012a; Gelsani et al., 2012). Despite Hawaii's longline fleet being the largest food producing industry in the state, the demand for seafood outpaces the locally produced supply (WPRFMC, 2020). As a result, Hawai‘i supplements its market demand through importation of seafood products from external sources. Today, Hawai‘i imports 63% of its commercial seafood supply, with 57% of the total coming from foreign countries such as Taiwan, Japan, Philippines, New Zealand, and China (Loke et al., 2012b; Gelsani et al., 2012). The remaining 6% of imports are sourced domestically from the United States mainland (Gelsani et al., 2012). Only 37% of available seafood consumption is from local commercial production (Gelsani et al., 2012).

2.1.3. Imported food supplies

Hawaii's current limited capacity for local food production has forced the state to resort to purchasing out-of-state food products to compensate for this deficit. Imported goods currently make up approximately 85-90% of the state's food supply which has had a profound impact not only on Hawaii's local food economy but has left Hawaii's population vulnerable to supply chain disruptions or interruptions in global food production (Office of Planning, 2012). The COVID-19 global pandemic and its effects on Hawaii's food system have very clearly demonstrated the precariousness of over-relying on external food supply chains (McGregor, 2020). Nationwide government-mandated shutdowns disrupted the off-shore production and distribution systems that Hawai‘i had come to depend on (McGregor, 2020). While this global disaster initially had adverse effects on Hawaii's food system, it also brought widespread attention to Hawaii's food security challenges and promoted local food production movements and self-sufficiency initiatives (McGregor, 2020).

In its Increased Food Security and Food Self-Sufficiency Strategy, the Hawai‘i Office of Planning and The Department of Business Economic Development & Tourism recognized the need to increase Hawaii's food self-sufficiency and proposed strategies to promote local food production (Office of Planning, 2012). In this plan, its authors outlined specific steps that could be taken to increase the demand for locally produced food, increase production of locally produced food, and guide policy changes that promote self-sufficiency (Office of Planning, 2012). Among these suggestions included expanding marketing campaigns to target public institutions and local schools to encourage them to purchase locally grown foods (Office of Planning, 2012). This was just one of the strategies included in this proposal, but the approach has become a priority in Hawai‘i and has been expanded on in SB 376 and HB 767 (Office of Planning, 2012; HI State Legislature, 2015; HI State Legislature, 2021).

2.2. The current status of Hawai‘i school food programs

In this section, we examine Hawaii's school food services program as it is currently operating, including the goals and values of the program, its current food procurement operations, and the progress it has made towards reaching the '30% local by 2030' programmatic goal established in House Bill 767. This analysis will include a discussion of the 'Aina Pono 'Farm to School' initiative and the progress it has made towards this goal in the years since its implementation.

2.2.1. HIDOE food procurement policies and program goals

According to its mission statement, the Hawai‘i Department of Education (HIDOE) is committed to providing an excellent educational experience to all of the students in the Hawai‘i school district by facilitating the formation of strong and caring relationships, fostering accessible and welcoming learning environments, and encouraging student connections with the local community and traditions (HIDOE, n.d.b). HIDOE has identified the importance of maintaining a wholesome school lunch program that prioritizes high-quality food ingredients as an essential component of this mission (HIDOE, n.d.b; Columbo, 2021). HIDOE currently utilizes food procurement protocols that operate under the principle that all purchases for the school lunch program should prioritize responsible spending in a way that optimizes the department's budget and resources to maximize the value return for investment (HIDOE, n.d.c). Under this system, different food distribution vendors compete for supplier contracts with

HIDOE Procurement and Contracts Branch (PCB) by submitting bids with their offers (HIDOE, n.d.c). Then, all bids are analyzed by the department and contracts are awarded to the most competitive applicant that can best satisfy the specifications of the product solicitation requests at the lowest cost to the department (HIDOE, n.d.c).

Under this system, Hawaii's school food services branch currently relies heavily on imported food supplies from the United States mainland, including commodity shipments from the federal government under the National School Lunch Program (Lyte, 2022; Mironesco, 2012). This practice has been exacerbated by the global COVID-19 pandemic, which altered school cafeterias to mainly 'grab-and-go' operations that require less scratch cooking and fresh ingredients (Lyte, 2021).

On a small scale, the purchasing of imported goods is a financially sound strategy to ensure that Hawaii's school lunch program has a safe and reliable food supply. However, this practice contributes to a larger systemic food supply issue in Hawai'i and a declining local food economy (Office of Planning, 2012). To address these concerns and promote a local school lunch program that contributes to state-wide self-sufficiency, the State of Hawai'i signed Senate Bill 376 (SB 376) in 2015, which established a 'farm to school' initiative in the Hawai'i school district, incorporating locally sourced produce into lunches (HI State Legislature, 2015). This program would eventually be renamed 'Aina Pono meaning 'righteous meal', to represent the initiative's overarching goal of promoting healthy eating habits by increasing the use of locally produced ingredients and helping students connect more with the land (HIDOE, n.d.a). In 2021, House Bill 767 (HB 767) was signed which defined an explicit program goal of increasing the volume of fresh, locally sourced food served in public schools to 30% by the year 2030 (HI State Legislature, 2021). HIDOE has embraced this goal and is committed to working through the 'Aina Pono program to buy more locally sourced ingredients for school lunches (BIG Staff, 2021).

2.2.2. Recent progress of the 'Aina Pono 'Farm to School' initiative

The 'Aina Pono 'Farm to School' initiative was initially launched by the Lieutenant Governor's Office in response to the signing of Senate Bill 376 in 2015 (HIDOE, n.d.a; Kanai, 2019). The intention behind this program was to increase the amount of locally grown fresh produce in school meals to promote state-wide self-sufficiency and help students establish

healthy eating habits in their critical years of development (HIDOE, n.d.a; Kanai, 2019; Columbo et al., 2021). In January of 2018, the Lieutenant Governor's Office collaborated with the Hawai'i Department of Education (HIDOE) and the Hawai'i Department of Agriculture (HDOA) to produce a pilot 'Aina Pono 'Farm to School' program at Mililani High School in O'ahu (HIDOE, n.d.a; Kanai, 2019). Since its inception in 2018, the Mililani High School 'Farm to School' program has made significant progress towards the programmatic goal of increasing the purchasing of locally grown food in school lunches (Hawai'i SFSB. 2019). In just one year under this program, local food procurement at Mililani High School tripled with fresh ingredients increasing from 16 to 50% and overproduction decreased by 20%, which saved approximately $100,000, and student participation in the program increased by 10% (Hawai'i SFSB, 2019). The success of this program has demonstrated that the 'farm to school' approach is a feasible method to increase locally grown produce in Hawai'i school lunches and that further investment in similar programs will facilitate the state-wide realization of the '30% local by 2030' goal (SFSB, 2019).

3. Methodology

The goal of this project was to work with the National Oceanic and Atmospheric Administration (NOAA) and Conservation International Hawai‘i (CI) to investigate the viability of integrating sustainable, locally caught seafood into Hawai‘i school lunches, contributing to the state’s self-sufficiency, promotion of sustainable fishing, and support of local industry. To achieve this goal, we completed the following two objectives:

1. Evaluate Hawaii’s fishery supply chain dynamics and existing distribution systems to identify potential options for supplying fresh fish to local school food systems.
2. Assess existing sustainable and school food programs to identify features of a successful program and strategies for implementation.

To complete these objectives, we performed interviews with distributors and fishery employees to gain insight into local Hawai‘i fishery distribution and supply chain management. Then for our second objective, we performed interviews with individuals with different connections to sustainable food programs to gain insight into the features of successful programs and to identify the potential barriers to implementing a ‘sea to school’ lunch program in the Hawai‘i school district. These methods allowed us to determine the viability of implementing a ‘sea to school’ pilot program in the Hawai‘i school district and propose to our partners, NOAA and CI Hawai‘i, a specific plan of action to continue making progress on this initiative.

3.1. Objective 1: Evaluate Hawaii’s fishery supply chain dynamics and existing distribution systems to identify potential options for supplying fresh fish to local school food systems.

Our first objective was to evaluate Hawaii’s fisheries and distribution systems, to understand Hawaii’s seafood supply chain. We performed an in-depth literature review to understand Hawaii’s complex fishery supply chains. This research included content on local seafood production, distribution systems, and demand from consumers, restaurants, and retailers.

To supplement our preliminary research, we performed semi-structured interviews with experts, management specialists, and other such individuals involved in the Hawai‘i fishery supply chain to better understand the role that fisheries, distributors, and management specialists play in delivering fish from the docks to markets or other business avenues. Interviews were set up over email and scheduled either in-person or via Zoom. Scheduled interviews were among all

four team members and with one supply chain expert or individual at a time. Interviews were performed in a neutral location to foster an open, comfortable, and trusting environment for our interviewees. At the start of every interview, we obtained informed consent and introduced ourselves using the script in Appendix A. Our planned questions for each interview group (fisheries and fishery management individuals) are found in Appendices B and C, and we added other questions depending on the individual's expertise or area of focus. There was one team member directing the interview questions, with all team members asking follow-up questions and taking notes. Table 1 lists each of the individuals that we interviewed for this project. These individuals were each selected based on their experience working in fisheries, fishery management, aquaculture, or distribution systems in Hawai'i. Many of our interviewees were recommended from our project partners, Jhana Young at CI Hawai'i and Celeste Hanley at NOAA. We sought additional interviewees by requesting contacts from those we spoke to. Each interview was transcribed and then summarized, and we provide qualitative analysis of the contents of the interviews.

Table 1: List of Interviewees from Hawai'i Seafood Industry Contacts

Name	**Organization**	**Role**	**Date of Interview**
Keith Kamikawa	NOAA Fisheries Pacific Islands Regional Office	Fisheries Management Specialist	1/18/2022
Dick Jones	Blue Ocean Mariculture	CEO	1/20/2022
Karlotta Rieve	Hatch Innovation Services	Restorative Project Manager	1/24/2022
Neil Hirasuna	Fresh Island Fish	Chief Financial Officer	1/25/2022
Jeremy Aoyagi	Fresh Island Fish	Director of Compliance	1/25/2022
Stephen Ueda	Suisan Company	President and CEO	1/26/2022
Jason Brand	Co-founder and Director	Kunia Country Farm	1/31/2022
Dr. Kai Fox	Sea Grant	Aquaculture Extension Specialist	2/1/2022
Jennica Lowell-Hawkins	Ocean Era	Finfish Program Manager	2/1/2022
Josh DeMello	West Pacific Regional Fishery Management Council	Fishery Analyst	2/8/2022

3.2. Objective 2: Assess existing sustainable and school food programs to identify features of a successful program and strategies for implementation.

Our second objective was to analyze existing sustainable school lunch programs and determine challenges and facilitators in their implementation. To carry out this objective, we

interviewed individuals with different levels of involvement in sustainable food programs. We recruited our interview participants from school communities with prior experience working on similar programs and those involved in sustainable food organizations. We attempted to interview representatives from the Hawai‘i Department of Education but were unable to acquire the necessary permissions to include their contributions in this publication. These semi-structured interviews helped us to determine effective approaches for sustainable school lunch programs by learning from past attempts and first-hand experiences. We prioritized interviews with individuals with direct experience participating in a sustainable school lunch program in Hawai‘i and those who otherwise had experience in the sustainable food industry.

We interviewed individuals involved in the development of implementation of a sustainable school lunch program to get a better understanding of what goes into the development and planning, how these projects function, and the response from those cooking and consuming the food. The interviewees were contacted through email to set up a meeting via Zoom or in-person, when possible (see Table 2 for our list of interview participants). We sought additional interviewees by requesting suggestions from those we spoke to. Each interview was transcribed and then summarized, and we provide qualitative analysis of the contents of the interviews.

All four team members were present during the interviews, with one team member tasked with leading the interview. We gathered consent from and introduced ourselves to the interviewee using the script found in Appendix A. Our planned questions for each interview group (school community members and sustainable food experts) are found in Appendices D and E, and we added other questions depending on the individual’s expertise or area of focus, as well as follow-up questions based on the interviewee's responses.

Following each interview, we transcribed the audio recording for analysis to identify what makes sustainable lunch programs difficult and what makes them work. The data from these interviews was shared with our partners for informal discussion following analysis, to determine how to plan for a ‘sea to school’ program in Hawai‘i.

Table 2: List of Interviews with Sustainable and School Food Experts

Name	**Organization**	**Role**	**Date of Interview**
Andrea Moore	Mililani High School	Vice Principal	1/26/2022
Gloria Pilar	Mililani High School	Cafeteria Manager	1/26/2022
Greg Christian	Beyond Green Partners	Founder/CEO	1/13/2022

Albie Miles	University of Hawai‘i –West O‘ahu	Assistant Professor of Sustainable Community Food System	1/19/2022
Alan Lovewell	Real Good Fish	Founder/CEO	1/28/2022
Lydi Bernal	Farm to School Hui	Coordinator	1/24/2022
Sophie Scott	Gulf of Main Research Institute	Sustainable Seafood Project Manager	1/27/2022
Alex Narrajos	Kōkua Hawai‘i Foundation	‘ĀINA In Schools, Program Specialist	2/1/2022
Kevin Chang	Kua'aina Ulu 'Auamo (KUA)	Executive Director	2/3/2022
Herb Lee	Pacific American Foundation	President and CEO	2/4/2022
Mark Noguchi	Punahou School	Food and Sustainability Curriculum Specialist	2/15/2022

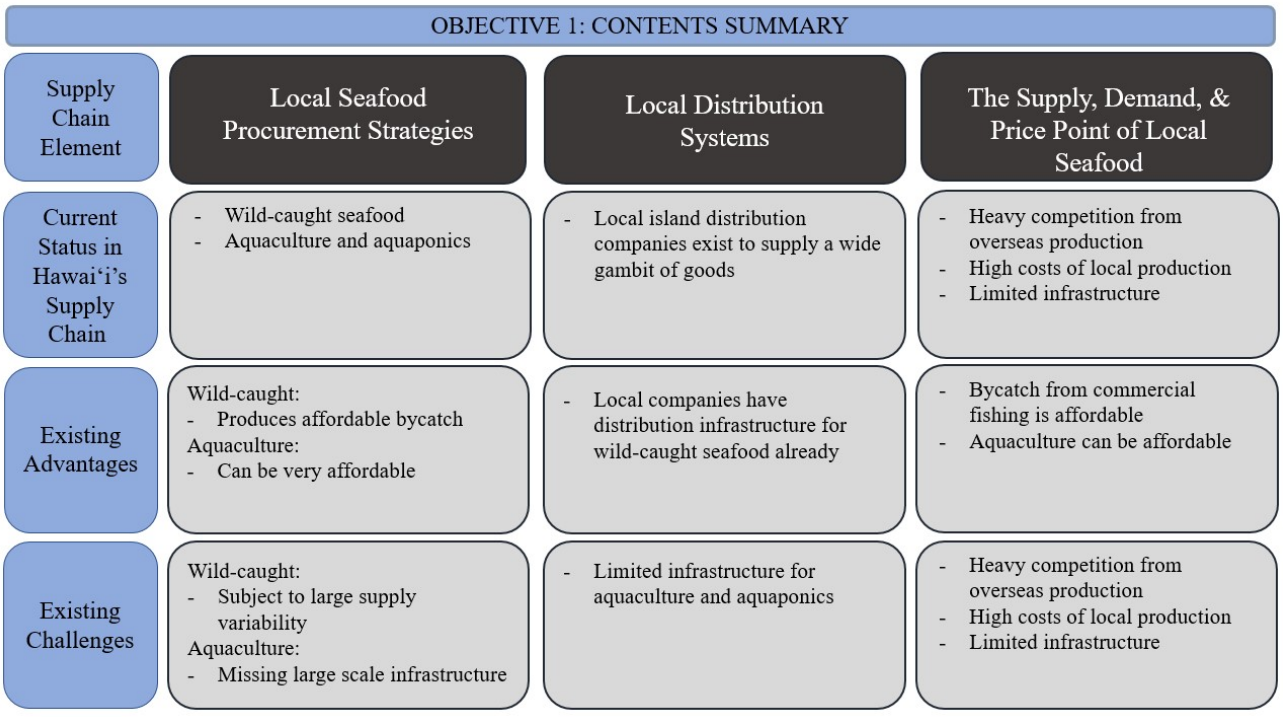
4. Results

In the following section, we compile the data collected for objectives one and two and generate a list of factors that will influence the prospect of a successful ‘sea to school’ program in the Hawai‘i school district. The contents of this chapter are derived from interviews with various expert informants and O‘ahu community members. From these interviews, we elected to include only information that exclusively contributed to our immediate goals for this project. However, the contents of all interviews performed in this investigation are summarized in Appendices F and G.

4.1. Objective 1: Evaluate Hawaii’s fishery supply chain dynamics and existing distribution systems to identify potential options for supplying fresh fish to local school food systems.

From the semi-structured interviews with the people listed in Table 1, we identified three main elements of the local seafood supply chain system in Hawai‘i which will determine the most suitable seafood supply options for a Hawai‘i ‘sea to school’ program. These include local seafood procurement strategies, existing distribution systems, and the supply, demand, & price point of local seafood (see Figure 2).

Figure 2: Objective 1 Content Summary



4.1.1. Local seafood procurement strategies

In this section, we detail our key findings on Hawaii's fisheries management and procurement strategies. These results were derived from our interviews with various experts on wild-caught fisheries and aquaculture farms in Hawai‘i. Keith Kamikawa, a Fishery Management Specialist at NOAA, explained that commercial longline fisheries are required to have division observers on their vessels to record events like interactions with protected species to ensure that all fishing operations are being performed responsibly. Hirasuna and Aoyagi, who represented Fresh Island Fish in our interviews, explained that they are required to report their catch to NOAA to monitor fishing quota and to Hawaii's Division of Aquatic Resources for scientific records. The activities of Fresh Island Fish and similar supply companies are also closely monitored for their impact on the environment. They are expected to adhere to environmental regulations such as using ultra-low sulfur diesel, maintaining the Clean Water Act regarding oil consumption, and dumping, and avoiding protected species.

Figure 3: Photo of Tilapia

Note: By Germano Roberto Schüür - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=40488546

While commercial longline fishing experiences many variations in their catch due to supply and operational abilities, aquaculture may provide another source of local, sustainable fish for a 'sea to school' program in Hawai‘i. Jason Brand of Kunia Country Farms on O‘ahu

described that their aquaponics facility operates with three goals in mind: grow food locally, grow food sustainably, and reduce food prices for the island. Kunia Country Farms' aquaponics structure involves a closed-loop system in which the waste produced by tilapia acts as a nutrient source for lettuce, and lettuce becomes a water filtration system for tilapia. A photo of their lettuce farm can be seen in Figure 1. Although tilapia, as shown in Figure 3, is not native to Hawai'i, the way Kunia Country Farms raises them offers a safe option to prevent their escape. The growing methodology of Kunia Country Farms utilizes zero-impact farming, where the only water used is rainwater, the only power used is solar, and plants are not grown in soil. Brand claims the farm is in the process of scaling up ten-fold to keep up with the demand for lettuce, meaning they would be producing 50,000 pounds of lettuce and 400,000 pounds of fish every week. Brand also states that this number outsizes Hawaii's demand for live fish.

Figure 4: Photo of Kanpachi (Greater Amberjack)

Note: By Diego Delso, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=91878041

In interviews with members of the fishery and aquaculture industries, school community members, and sustainable food organizations, we inquired about the potential best fit species to introduce into local school lunches. Many experts pointed to tilapia, including Dick Jones, Dr. Bradley (Kai) Fox, and Lydi Bernal. Common opinions included tilapia having a bland taste making it palatable for kids, easy to prepare in different forms, and proving to be a more cost-effective option. Tilapia is also often marketed locally under a different name, like Hawaiian sunfish, to appeal to local consumers, which these experts confirmed may be necessary. Jennica

Lowell-Hawkins, from Ocean Era, explained that the aquaculture industry is currently exploring the viability of harvesting native species like kanpachi, nenue, and mahi mahi, indicating that in the future, the local aquaculture industry may offer more options in addition to tilapia. A wild kanpachi is pictured in Figure 4.

4.1.2. Existing seafood distribution systems

Hirasuna and Aoyagi, from Fresh Island Fish, discussed the role that a seafood processor plays in seafood distribution systems on O‘ahu. Fresh Island Fish sends its fishing vessels on twenty-day journeys that return to Pier 38 for their catch to be processed, the unloading of tuna at Fresh Island Fish can be seen in Figure 5. Fresh Island Fish completes the tedious and otherwise costly processing, so preparation is more manageable when the fish leaves their facility. Stephen Ueda added that Suisan Company is another distributor on Hawai‘i Island that supplies fish directly from fishers. Unlike Fresh Island Fish which operates its own fleet, their supply is from individual fishers with smaller boats. Y. Hata & Co. is a broadline distributor that is the existing distributor for the Hawai‘i Department of Education, although the study surrounding their distribution role is limited due to not being able to contact them directly.

Currently, as confirmed in many interviews, schools in Hawaii’s school district rarely have seafood options on the menu and if they do, it is in the form of fish sticks. Alan Lovewell, creator of the Bay2Tray program, confirmed that the delivery of frozen fish would be essential to the success of a ‘sea to school’ program. Bay2Tray is a program in California that delivers local seafood, that was once bycatch, to school districts for lunches. The program also includes classroom visits from fishermen and the local seafood is often served as fish tacos rather than typical fish sticks. Lovewell asserted that being able to store the fish frozen for extended periods can help flatten the supply variability and make up for the seasonal nature of fishing.

4.1.3. Supply, demand, & price point of local seafood

In our discussion with Sophie Scott, who oversees the Gulf of Maine Research Institute (GMRI) ‘sea to school’ initiatives, she described some challenges with procuring a local seafood supply for the lunch programs. She explained that even in coastal or island communities, local seafood producers and distributors struggle to compete in the global marketplace. As a result, the United States imports approximately 90% of the seafood consumed each year rather than utilizing local production. Dr. Albie Miles from the University of Hawai‘i West O‘ahu explained

that local seafood production can be especially challenging in Hawai‘i due to high production costs and heavy competition from oversea companies. He explained that the reason behind this is a lack of the necessary infrastructure to support large scale local seafood production.

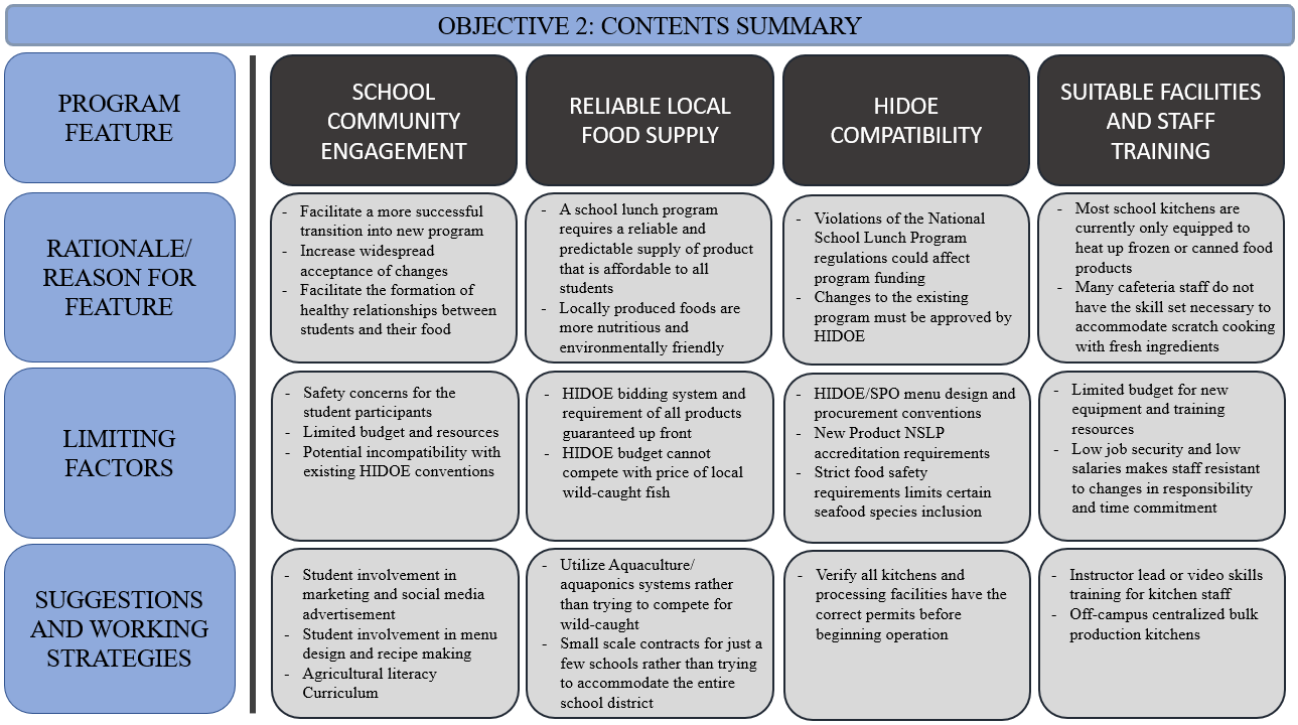
To gain insight into the local supply chain systems that are currently in operation in Hawai‘i, we spoke to Fresh Island Fish representatives Jeremy Aoyagi and Neil Hirasuna as well as aquaculture specialist and Ocean Era Finfish Program Manager Jennica Lowell-Hawkins. Aoyagi and Hirasuna explained that local seafood production and distribution in Hawai‘i is determined almost exclusively by the tourism industry. They said that restaurants and hotels in populated tourist areas are usually the most competitive customers of local seafood supplies, limiting the amount of high quality locally sourced seafood that is affordable and accessible to Hawaii's local population. Aoyagi and Hirasuna suggested that bycatch species could be a more affordable option for schools as they can be as inexpensive as $1 per pound. However, they expressed concern that the fluctuation in the amount of bycatch and market prices can make it challenging to make sales to HIDOE, which would prefer a supply that is predictable and reliable. Similarly, Stephen Ueda mentioned that ta‘ape, an invasive fish species in Hawai‘i waters, is abundant and affordable, but he also has concerns about consistent supply. As a result, in most cases the only seafood options that are accessible to schools are the cheaper frozen imported products.

Figure 5: Photo of Bigeye Tuna Being Unloaded from the Ship

Note: Taken during a tour of the Fresh Island Fish facility in Honolulu

Another challenge identified by both Lowell-Hawkins and Aoyagi & Hirasuna is the scale of the demand. Lowell-Hawkins estimated that to provide the 160,000 students in the Hawai‘i school district with a serving of fish every week, this would require approximately 40,000 pounds of fish per week or approximately 1,000,000 pounds of fish per school year. This is a demand that both organizations believe would be challenging to accommodate under the current HIDOE procurement systems. Aoyagi and Hirasuna expressed that while there is a high enough rate of wild-caught production to support this demand, the variability in supplies, fluctuating market value of fresh fish, and financial competition from tourists would make it challenging to work with HIDOE. Lowell-Hawkins expressed that while aquaculture would provide a more reliable supply and predictable price-point of fish, it is still in its early stages of development in Hawai‘i and would not currently be able to accommodate the supplies a school would require. Both organizations suggested that smaller-scale operations with only a few schools in HIDOE and long-term contracts with suppliers might help to mitigate some of these challenges.

Figure 6: Objective 2 Content Summary



4.2. Objective 2: Assess existing sustainable and school food programs to identify features of a successful program and strategies for implementation.

The contents of this section are derived from the interviews listed in Table 2. From the compilation of these investigations, four common important features emerged that characterize a successful 'sea to school' lunch program. These include compatibility with the Hawai'i Department of Education regulations and food safety standards, a reliable supply of local seafood products, properly equipped kitchen facilities with suitably trained kitchen staff, and positive school community engagement with the program (see Figure 6).

4.2.1. Compatibility with Department of Education regulations and food safety standards

The Hawai'i Department of Education (HIDOE) has several specific requirements that must be met before bringing any food into schools. The lunch served by HIDOE is a part of the National School Lunch Program (NSLP), which defines those requirements and offers funding based on student participation in the program in each district. The U.S. Department of Agriculture (USDA), which administers the NSLP, outlines specific meals and menu cycles for the district to follow, in which they include nutritional targets for any product served in schools and acceptable substitutes for students with dietary restrictions. Any new product added to the menu must pass an NSLP accrediting process and satisfy the nutritional requirements. In addition to satisfying the nutritional requirements, to be approved as a supplier, a company must also meet the State Procurement Office business and supply capability assessment. This guarantees that the company can meet the terms of the contract. The last major component that distributors and producers must meet is FDA food safety standards. As with most food products, cooking and storage temperatures need to be managed for food safety, but seafood presents concerns with mercury content and the presence of nano- and microplastics. Farm-raised fish have an advantage over wild-caught fish, as they present lower levels of both these concerns (Hurley & Binkowski, 2012).

Alan Lovewell, the founder of Real Good Fish, corroborated this information about the strict regulations that need to be followed when working with the Department of Education. Real Good Fish is a California-based seafood distribution company that works to increase locally produced seafood consumption by delivering to community members and through community food initiatives such as the Bay2Tray program that supplies Monterey Bay schools with fresh

local seafood. Lovewell asserted that when working with the Department of Education, seafood products must meet all food safety and nutritional requirements to enter schools. He described that an easy way to meet the safety standards is to ensure that all processing facilities, storage facilities, and kitchens in which the products are being handled are equipped with the correct permits and that the transportation of products is closely monitored.

4.2.2. Local seafood product procurement

The procurement process supplying food ingredients to the district schools in Hawai‘i is complex and relies on a statewide menu. Once the menu is designed, the School Food Services Branch (SFSB) and State Procurement Office will create a list of the ingredients that need to be purchased. Then they will publish bid estimates with rough approximations of how often a given item will be needed for the year. When these are published, different distribution companies bid on the contracts, and after vetting each offer for compatible vendors, product taste tests are performed with students to finalize the contracts. Most of these contracts supply an entire school year's worth of product. However, sometimes a shorter-term program is created where HIDOE will work directly with local farmers. For example, HIDOE created the Harvest of the Month program which selects a locally sourced ingredient every month that the school menus are built around for that period (Hawai‘i SFSB, 2019). While these efforts have made significant progress in increasing locally produced food in school lunches, only around 10% of the food served in schools is locally sourced, with most of that coming from local fruits and vegetables. There is more progress to be made to reach the ‘30% locally sourced by 2030’ goal defined in House Bill 767.

Stephen Ueda, the CEO of Suisan distribution company, discussed some of his experience working with HIDOE. He stated that HIDOE would send out a bid before the school year started with a list of all the products they thought they would need to serve in lunches based on a menu schedule, which is created by HIDOE before the suppliers are sought out. He explained that winning the bid did not necessarily mean the school would purchase whatever the distributor had agreed to supply. However, even though the schools could not guarantee that they would purchase the product, the distributor would still be required to guarantee that it was in stock to secure contracts. This often resulted in unused and unsold products, which would just be wasted at the end of the school year. Ueda expressed that HIDOE does not explicitly reveal the menu items to the distributor or how the ingredients would be used, so distributors would have to

deal with some uncertainty about what products the schools would use and when they would use them.

One potential supply opportunity of local seafood is currently under development at Kunia Country Farms, an aquaponics company based on O‘ahu. According to Jason Brand, the co-founder and director, the company is expanding within the next few years and will quickly outgrow the market for tilapia on the island. Brand stated that one of their goals is to use the excess tilapia to create fish sticks or patties and work with the SFSB to serve them in schools, providing a good source of local fish that will not have high prices. As discussed by Brand, they have begun the process of certifying and accrediting their product to the NSLP requirements. On top of the accreditation, Kunia has performed several taste tests with students who all have seemed to enjoy the product.

4.2.3. Proper kitchen facilities and staff training

Lydi Bernal, who oversees the Farm to School Hui, said that many school cafeterias in the Hawai‘i school district lack the necessary tools and equipment to accommodate the processing and preparing of fresh ingredients. Additionally, the staff usually works with ready-to-bake products, which are precooked and only require warming before serving, and therefore do not have the skills necessary to be scratch-cooking meals every day. In our interview at Mililani High School regarding their ‘farm to school' program, Vice Principal Andrea Moore explained how there can be resistance from both the cafeteria staff and school lunch program managers who oversee these operations. She attributes this resistance to a lack of investment from HIDOE in training and properly compensating full-time kitchen staff rather than opting to hire part-time employees. She asserted that it is very difficult for people to live on a part-time salary in Hawai‘i. This makes school food service an unsustainable job for most people and those that do take the jobs often cannot afford to commit to extra hours or invest the increased time and effort to work with fresh ingredients.

Both Sophie Scott from the Gulf of Maine Research Institute (GMRI) and Greg Christian from Beyond Green Partners, a sustainable foodservice consulting company, have encountered resistance from kitchen staff while working on their respective local food programs. Both attribute some resistance to fear of change and the perception that preparing fish filets is too challenging and time-consuming in school kitchens. However, both Scott and Christian said they

have been able to mitigate these challenges by implementing training programs for kitchen staff to increase their confidence in the kitchen. When describing his holistic approach to training, Christian emphasized the importance of not only technical skills, such as how to use cooking equipment and appliances or measure correct portions, but also leadership and accountability training to help increase confidence in the kitchen. He suggested that training seminars should keep specific needs of the kitchen in mind, including accommodation for any facility limitations.

Instead of altering an existing kitchen, the founder of Real Good Fish, Alan Lovewell, suggests investing in off-campus centralized kitchens that could accommodate bulk food production and portion out meals to be delivered every day to schools. Lydi Bernal said this is an idea circulating HIDOE, but no work is currently underway to implement such a system.

4.2.4. Community engagement with the local food program

A common sentiment that emerged from several interviews was the importance of engaging the school community as much as possible with every step of the design, implementation, and maintenance of a 'sea to school' program. In our discussions with Greg Christian from Beyond Green Partners and Sophie Scott from the Gulf of Maine Research Institute (GMRI), they both emphasized that student and faculty participation in their respective sustainable school food initiatives helped to facilitate a smooth transition into the new programs and to promote a more widespread and rapid acceptance of the changes.

In his work as a kitchen efficiency consultant, Greg Christian's philosophy is that before you can even start designing the program, you need to understand the goals, values, and preferences of the community that it is to serve. He suggested speaking to students about the foods they like to eat, aspects of the existing program that they enjoy, and improvements they would like to see in the new program. One method he suggested to get students engaged with the program is to encourage their involvement in planning the program menu. A strategy that he has utilized in some of his projects was to challenge the students to compete with their peers to create and cook a new lunch recipe. Then, he incorporated the winning dish into the menu. He also suggested speaking to cafeteria staff about what changes they want to see, including what foods they want to make and details regarding their equipment and facilities.

While describing her work with the GMRI 'sea to school' initiative, Sophie Scott identified the common misconception that students do not like to eat seafood. She said this fear

can create a major obstacle to incorporating more local seafood in school lunches as many cafeteria staff refuse to serve it. One method that both Scott and Vice Principal Andrea Moore from Mililani High School suggested was marketing the ingredient changes to the students and getting them involved in the advertising campaign, using popular social media platforms that the students are using such as TikTok. Sophie Scott also emphasized the important role of education in mitigating these fears and promoting the consumption of locally sourced seafood. Several interviewees, including Sophie Scott and Alex Narrajos from the Kokua Hawai‘i Foundation, suggested creating a sustainability and agricultural literacy curriculum to complement the ‘sea to school’ program. Scott said that it is often very challenging to get these curriculums into schools because of tight schedules and resource limitations, but one way to address this is to get input from teachers on their ideas and format preferences for these materials.

5. Synthesis and Recommendations

The overarching goal of this project was to investigate the viability of integrating sustainable, locally caught seafood into Hawai‘i school food services to promote the state’s self-sufficiency efforts. In this investigation, we used interviews to complete the following two objectives:

1. Evaluate Hawaii’s fishery supply chain dynamics and existing distribution systems to identify potential options for supplying fresh fish to local school food systems.
2. Assess existing sustainable and school food programs to identify features of a successful program and strategies for implementation.

The compiled results of these two objectives were used to inform the recommendations we provide to our partners at Conservation International Hawai‘i (CI Hawai‘i) and the National Oceanic and Atmospheric Administration (NOAA) on how to implement a successful ‘sea to school’ food service program for the Hawai‘i school district. The following section outlines these recommendations, short term and long-term goals for the project, and immediate next steps to take. These recommendations are intended to be used as a starting point for our project partners to continue making progress on this initiative. It is likely that progress on this project will happen in small steps over time. We suggest starting small with a single ‘sea to school’ pilot program and then expanding from there.

5.1. Recommendations for project collaboration with HIDOE

Since the Hawai‘i Department of Education (HIDOE) School Food Services is a federally funded program, any amendments to the current program operations must be compliant with federal and state safety guidelines and be approved by HIDOE. As such, any program design and implementation efforts will undoubtedly be performed most efficiently in close collaboration with HIDOE. In this section, we propose recommendations for specific actions that can be taken to promote collaboration and facilitate the realization of the shared goal of creating a public-school lunch program that will most effectively serve the students of the Hawai‘i school district. Our recommendations include the following:

1. Establish a dedicated multidisciplinary ‘sea to school’ task force with representatives from both within and external to HIDOE who will work collaboratively to establish a

state-wide ‘sea to school’ lunch program in Hawai‘i, using the inferences and recommendations in this report as a guide.

2. Subdivide the Hawai‘i school district into smaller subdistricts, each with separate food procurement operations and localized supplier connections.
3. Refocus the bidding procurement policies currently being utilized by HIDOE Procurement and Contracts Branch to accommodate multiple smaller localized supplier contracts to make business with local suppliers a more viable financial option.

5.1.1. Establish a dedicated ‘sea to school’ task force

As this project enters the next stage of development, we recommend establishing a dedicated multidisciplinary ‘sea to school’ task force with members representing HIDOE, NOAA, and CI Hawai‘i, as well as other interested parties. These include organizations such as Hawai‘i Farm to School Hui and Kokua Hawai‘i Foundation. Many of the representatives we interviewed from organizations external to HIDOE expressed that they are either actively working on a 'sea to school' or 'farm to school' initiative or would be interested in contributing to these projects. The purpose of this task force would be to establish a formal platform for collaboration among these different organizations to compile resources, ideas, and connections.

In Table 3 we list the organizations we believe would be valuable additions to this team along with the resources and skills we believe they would be able to contribute. While this will be an interdisciplinary team with members that possess different skills and resources, it is imperative that the sole focus of the task force is designing and making plans for the ‘sea to school’ and ‘farm to school’ initiatives. Ideally, members would meet regularly to brainstorm and propose ideas, make updates on progress, re-evaluate project goals and next steps, and share new knowledge or resources. To facilitate the formation of this task force, we have filmed a short information video for our project partners to use for recruitment efforts.

Table 3: Recommended ‘Sea to School’ Task Force Membership

Organization/Branch	Contact Information	Potential Contributions
HIDOE School Food Services Branch	HIDOE SFSB (808) 784-5500	Funding Records of spending and allocation of resources
HIDOE Procurement and Contracts Branch	DOEprocure@hawaiidoe.org	Procurement operations oversight

National Oceanic and Atmospheric Administration (NOAA)	Celeste Hanley celeste.hanley@noaa.gov	Networking and connections Authority on sustainable fishing and responsible ocean resource management
Conservation International Hawai‘i (CI)	Jhana Young jyoung@conservation.org	Program networking facilitation Understanding of environmental impacts
Hawai‘i ‘Farm to School’ Hui	Lydi Bernal lydi@hiphi.org	Networking with distributors and schools Educational programming
Kokua Hawai‘i Foundation	Alex Narrajos alex@kokuahawaiifoundation.org	Educational programming
USDA Hawai‘i	USDA Hawai‘i Administration (808) 933-8323	Leadership on food safety policies

Note: The contact information listed above is intended to be used to make connections with these organizations rather than to set exclusive membership to this task force, nor is it limited to just these organizations.

5.1.2. Subdivide the Hawai‘i school district for food procurement operations

In our interviews with various distribution companies, many communicated that a significant limiting factor for creating local contracts with HIDOE’s Procurement and Contracts Branch (PCB) is the immense size of the Hawai‘i school district. Many local seafood suppliers and distribution companies that would otherwise be compatible with the goals of this project are not producing on a scale that would be able to accommodate the demand from the 256 schools in the Hawai‘i school district. This led us to conclude that, initially, rather than trying to create a single unified program for the entire state of Hawai‘i, ‘sea to school’ public school lunch programs should be designed and implemented on a smaller scale by individual public schools or in small clusters of schools. As such, we recommend that the ‘sea to school’ task force collaborate with HIDOE to subdivide the Hawai‘i school district into smaller sub-districts, each with its own menu designs and procurement contracts.

In our interview with Suisan Company CEO Stephen Ueda, he explained how HIDOE prefers to perform procurement operations with one single food distribution company that could service all of the islands to simplify the bidding system and make purchasing less expensive. Decentralizing the food procurement operations by splitting up the Hawai‘i school district will make supply contracts with local suppliers more financially and logistically viable. In this system, subdistricts would separately evaluate the different local production options to their

specific geography and assess their own needs and the best fit for them, reducing the shipping cost and the number of food miles being produced. This would allow alternative local seafood products, such as those from aquaculture or wild-caught bycatch, to compete with imported products. Additionally, this system would not automatically disqualify local suppliers that cannot supply products for the entire district but could be producing reliably on a smaller scale for one island or a cluster of thirty schools. Completely decentralizing HIDOE's food procurement strategies will undoubtedly take years to accomplish so we recommend that this process starts with sub-procurement operations that prioritize just fresh food ingredients.

5.1.3. Consider refocusing HIDOE procurement policies to accommodate local supply contracts

We recommend that efforts are made in collaboration with the Hawai‘i Department of Education (HIDOE) to consider redefining or refocusing the procurement policies that are currently being utilized by the PCB to accommodate multiple small, localized supplier contracts. Our interviews with local Hawai‘i seafood suppliers and distribution companies revealed that one of the barriers limiting their ability to create supply contracts with the Hawai‘i school food services program is HIDOE's policies and protocols surrounding food procurement. HIDOE PCB currently utilizes a competitive bidding system for procurement operations, in which vendors compete for supplier contracts with HIDOE. To maximize spending efficiency, all bids are analyzed, and the most competitively priced suppliers are selected for contracts.

In our interview with Suisan Company's CEO Stephen Ueda, who has worked directly with HIDOE procurement teams, he explained this system from the perspective of the distribution companies and how it can be limiting to potential local suppliers. He said that, at the beginning of the year, HIDOE procurement teams release lists of products that they need for the year and specifications for quantities. Naturally, the most competitive bids, which would be the most attractive to HIDOE, are those that can guarantee a consistent supply of bulk products for the entire year upfront. As a result, the most competitive supply companies are usually those that import frozen or processed products that can be stored for long periods and are relatively cheap to ship. Therefore, while this system does not technically exclude the possibility of contracts with local suppliers, it does make it challenging for smaller local supply companies to compete for contracts, since availability and costs of fresh seafood are less predictable and are often more expensive to handle, store, and ship.

Therefore, efforts to increase usage of locally sourced seafood and fresh ingredients in the Hawai‘i school lunch services program will require working with HIDOE PCB to restructure the procurement systems. Some of these adjustments could include multiple smaller decentralized contracts with individual schools or subdistricts as well as reassessing policies to prioritize local bids and allow for contracts for products that are not necessarily traditionally utilized, such as bycatch or aquaponics products.

5.2. Recommendations for program compatible supplies & distribution systems

Based on the information gained from our interviews, we identified two sets of recommendations for how local seafood could be served in schools. These recommendations include the following:

1. Prioritize alternative seafood products, such as fish raised in local aquaculture and aquaponics systems or commercial bycatch in ‘sea to school’ food procurement contracts.
2. Promote the further development of local seafood processing facilities that will provide ‘ready-to-bake' seafood products that will better accommodate school kitchen facilities.

5.2.1. Bycatch and aquaculture

Bycatch, is the “discarded catch of marine species and unobserved mortality due to a direct encounter with fishing vessels and gear.” These products are already used as a local seafood supply by Real Good Fish in their Bay2Tray program, which provides school lunches using locally sourced ingredients to students in the Monterey Bay area (NOAA Fisheries, n.d.b). Since bycatch species are not targeted by most commercial markets, this supply is often available at more affordable prices than the more popular species that are being targeted in commercial longline fishing operations. However, while bycatch is often more financially viable, the supplies of commercial bycatch at any one time are unpredictable and can fluctuate heavily. This can be challenging when working with school food programs that would prefer a more reliable supply. To work around this issue, Real Good Fish freezes the fish used to supply the lunches, allowing them to reduce that variability by storing excess and using it when supply drops. Neil Hirasuna and Jeremy Aoyagi from Fresh Island Fish confirmed that this supply variance for bycatch also exists in Hawai‘i fisheries, with species such as striped marlin and opah.

Our primary recommendation is to seek supplies from aquaculture and aquaponics. Fish farming can provide greater consistency than bycatch to supply a school year-round without

needing the large, and currently nonexistent, freezer infrastructure once the industry expands. In addition, depending on the species, the price point can be competitive with bycatch. This option has some groundwork already done in Hawai‘i, with Kunia Country Farms expanding their facilities and increasing tilapia production around tenfold. Jason Brand, the co-founder and director of Kunia Country Farms, also revealed that they are in the process of having ready-to-bake products, such as fish sticks or fish patties, made using their fish certified for school lunches. Fish products like these are already validated for school lunches by the USDA, so to get their product supplying schools, all Kunia Country Farms must do is become a certified manufacturer. Jason Brand informed us that he feels that process would not be too challenging as they are already certified for their lettuce production and have a good relationship with HIDOE. Kunia Country Farms is preparing to start providing lettuce to schools, adding to the amount of local produce used by HIDOE. He hopes to integrate these tilapia products for the 2023-2024 school year. While Kunia Country Farms is making good progress towards getting local seafood into schools, they are not the only organization working in their market. There are several other aquaculture and aquaponics companies working across the Hawaiian Islands. These other firms could also provide seafood for schools around them, reducing the strain on any single company while making the system more distributed and robust.

As a result, as the ‘sea to school’ task force is working on designing the program and making connections between local suppliers and schools in the Hawai‘i school district, we recommend prioritizing alternative seafood products either from commercial bycatch or those produced in aquaculture and aquaponics systems. These will likely be the most financially viable local seafood products for a ‘sea to school’ program.

5.2.2. Scratch-cooked vs. ready-to-bake

To determine the most suitable product form for a ‘sea to school’ program, both HIDOE procurement strategies and present school kitchen capabilities must be considered. If a school has a full-scale kitchen, like Mililani High School does, they could cook fish dishes from scratch, offering a wider variety of menu options, while another school without such a kitchen or farther from a distributor or industrial freezer could use a ready-to-bake product like those Kunia Country Farms is developing.

In the short term, we suggest that a ready-to-bake product, like pre-cooked fish sticks or patties that only require warming before serving, are prioritized to allow schools to incorporate locally sourced seafood into school lunches without having to invest in kitchen facility updates. However, if these improvements take place in the future, these procurement operations could be refocused to include more raw seafood ingredients for scratch cooking.

However, to ensure that these seafood products are readily available to be purchased for these programs, we recommend that the ‘sea to school’ task force works to promote the further development of local seafood processing facilities, especially those that will provide ‘ready-to-bake' seafood products.

5.3. Recommendations for program design & implementations strategies

Based on the information gained from our interviews, we identified two sets of recommendations for how a successful ‘sea to school’ program in Hawai‘i schools should be designed and implemented. These recommendations include:

1. Encourage community involvement to gather student, parent, and faculty support for the initiative.
2. Accommodate kitchen facilities and guide staff training to maintain accountability and food preparation skills.

5.3.1. Encourage community involvement

Implementing a successful ‘sea to school’ program in Hawai‘i schools would first require communicating that not all kids hate seafood and assessing its acceptance relative to other school foods. In numerous interviews, many experts asserted that kids do in fact like seafood, and there are plenty of ways to offer desirable seafood dishes at lunches. Kunia Country Farms has been working with HIDOE to conduct taste tests for students to try prepared dishes of fish from their aquaponics facility. Kunia Country Farms expressed there was a great success with fish sticks and fish nuggets, and that there are plans to hopefully incorporate their fish into Hawai‘i schools by the 2023-2024 school year. Kunia Country Farms serves as great inspiration and a recommendation would be to take advantage of taste tests to engage students in the local seafood introduction process. Another recommendation to involve students is to conduct surveys to understand what seafood they would prefer to see on the menu. These surveys would allow the kids to feel heard and important, potentially creating wider acceptance of a ‘sea to school’

program. A survey would provide students a chance to be a part of the decision-making process for included menu items, where taste tests could then gauge preference and waste management. Conducting waste surveys would also be beneficial to determine what new seafood products had more waste afterwards. It is not ideal to add new local seafood items to the menu just for there to be incredible amounts of waste later.

Another recommendation for student involvement is engaging with student council groups and encouraging enthusiastic attitudes towards a new 'sea to school' program. Once a small group of students is on-board with the initiative, excitement is more likely to spread further among the student body. In interviews with Sophie Scott from Gulf of Maine Research Institute and Andrea Moore, Vice Principal of Mililani High School, they suggested allowing students to advertise the initiative through popular social media platforms, and in-school marketing with the student council. We recommend involving the students as much as possible in promoting local seafood in the schools to mitigate resistance. While student involvement is important, parent involvement will be crucial. In an interview with Alan Lovewell, founder of Real Good Fish, he expressed that no school district wants to deal with angry parents. The transition will be more manageable if the sustainable school food initiative has parent and faculty support. We also recommend spreading awareness about the initiative to PTA groups by informing and ensuring parents that their children will be eating fresh, local, and nutritious meals at school instead of processed items. PTA groups could also be involved in collaboration with an individual who does work similar to Greg Christian from Beyond Green Partners. Christian helped Mililani High School with their transition to more local and fresh food in the cafeteria. He was responsible for training their kitchen staff, communicating with students on preferred dishes, and gaining acceptance for the program on all levels. Such a collaboration could comprise of holding school community food events which feature the sampling of proposed local seafood menu items.

After learning about Real Good Fish's Bay2Tray program and their success with fisher classroom visits to educate the students regarding the local fish they consume in the cafeteria, we recommend that Hawai‘i schools use this as an example to extend local seafood from the lunch menu to the curriculum. This would involve the local community more, allow interaction with the students that their product is serving, and provide a well-rounded education about local industries in Hawai‘i. This curriculum could also include other educational aids and resources, such as agriculture literacy materials. Another recommendation to provide the students with a

curriculum surrounding a ‘sea to school’ program is to form connections between teachers and local fishponds or aquaculture facilities. This would establish opportunities for the students to take field trips to visualize and learn about the origin and production of local seafood from their lunches.

Based on information gathered from many interviews, HIDOE’s current school food policies and practices present considerable obstacles to the implementation of a ‘sea to school’ program in Hawai‘i. This challenge can be attributed to the single state-wide school district, strict distributor guidelines, and lack of positions to adequately handle local food programs. To combat these setbacks, one of our recommendations is to gain politician support. Policy changes around subdistricts and localized contracts are suggested for a ‘sea to school’ program to be correctly designed and implemented in Hawai‘i. Political endeavors tend to take copious amounts of time, however, with a politician endorsing the initiative, speeding up policy changes may be achievable.

5.3.2. Accommodate kitchen facilities and guide staff training

An additional factor that is essential to the design of a ‘sea to school’ program in Hawai‘i is a well-performing cafeteria kitchen. Information gathered from multiple interview participants regarding school cafeterias indicated that most schools are working with outdated equipment and rely mostly on pre-cooked meals that can be reheated. One of our recommendations is to update kitchen equipment and facilities, where possible, for a functional ‘sea to school’ program. Furthermore, this may require a higher skill level from cafeteria staff. We discovered in many interviews that there can be significant resistance from kitchen staff when a new system is proposed. A key recommendation is to provide training for these workers that includes food-preparation skills, cooking skills, and accountability. It is important to inform them that this change is manageable in small steps, over time. A school would benefit from bringing in an individual to train the kitchen staff and help establish a new sustainable seafood school lunch program. After visiting Mililani High School, it became clear that a cafeteria staff that is excited to do their job and provide healthy meals to the students is central to the success of the program.

6. Conclusion

In this project, our team examined the viability of implementing a successful ‘sea to school’ program in the Hawai‘i school district. In this investigation, we identified the obstacles that would likely impede progress in implementing such a program, including those related to available food supplies, processing and distribution infrastructure, and HIDOE procurement policies. We used the results of this investigation to develop strategies for program implementation, which we communicated as a list of formal recommendations. These recommendations were also featured in an informational recorded presentation that we created for our project partners to use as a resource for spreading awareness and gaining support for such a program in the future. Although we have identified significant obstacles in implementing a ‘sea to school’ program in Hawai‘i, we found some surprising discoveries that could make such a program viable. It is our hope that the recommendations included in this paper will help to facilitate continued progress on Hawaii’s ‘sea to school’ initiative and promote state-wide self-sufficiency.

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Appendix A: Script for informed consent for interviews

We are a group of undergraduate students from Worcester Polytechnic Institute in Massachusetts, working in collaboration with Conservation International Hawai‘i and NOAA to assess the viability of and obstacles in the way of implementing a ‘Sea to School’ program in Hawai‘i.

We are interested in hearing about your work in [project relevant industry/experience].

Your participation in this interview is voluntary and you may withdraw at any point in this process. If you do wish to proceed, we would like to record the interview to help with our data analysis, is this alright with you? Our findings will be submitted to our university to be published at the beginning of March and as such if you would like to remain anonymous in the report, we can accommodate that, would you like us to withhold your name in the publication? We can also provide a final draft of the results to you for review around the last week in February, would you like to review the report?

Appendix B: Script for interviews with fisheries and fishery management specialists

Question 1: What is your role regarding fisheries and the fishery supply chain in Hawai‘i?

Justification: We wanted to understand how different members of the fishery supply chain have varying responsibilities and where they export the fish to exactly?

Question 2: Are there measures in place to ensure sustainable fishing techniques?

Follow-up Question: How do management practices affect these measures?

Justification: We wanted to learn if management practices affect the prevalence of sustainable fishing techniques being utilized among fisheries.

Question 3: Are invasive species part of the recurrent catch?

Justification: We wanted to learn if fisheries are taking advantage of invasive species or continue to overfish popular species.

Question 4: Do you currently maintain a relationship with a distributor that consistently sells your seafood supply?

Justification: We wanted to know if there are already consistent supply relationships that exist before introducing the idea of one with a local school.

Question 5: What methods are used by sustainable fisheries to obtain fish, and do they follow a set of guidelines?

Justification: Do local fisheries follow sustainability regulations and are there different ways to secure a consistent local fish supply?

Appendix C: Script for interviews with fishery supply chain distributors

Question 1: What exactly is a distributor's main responsibility regarding delivery of fish?

> Justification: We wanted to better understand the distributor's responsibility and guarantee that it would be feasible to make a connection between them and a local school.

Question 2: What are the steps involved with distributing fish from the docks to markets; start to finish?

> Follow-up Question: Are there specific guidelines or regulations that you must follow?
>
> Justification: We wanted to understand the regulations necessary to meet in order to distribute fish to schools.

Question 3: What are some current businesses or organizations that you have connections with?

> Justification: We wanted to gather all information possible in order to recommend another distribution partnership, concerning obstacles, success, and other potential connections.

Question 4: Are there any established distribution partnerships with schools in place?

> Justification: We wanted to potentially make connections with them as well and learn what makes a successful distributor-school partnership?

Question 5: Is there currently a great demand for the supply, or is there excess?

> Justification: If there is quite often an excess of their seafood supply, they may be more willing to create a partnership to distribute fish to local school cafeterias.

Appendix D: Script for interviews with school members

Question 1: What is your role in the school community?

Justification: We wanted to compare how the experience of a sustainable school lunch program differed between groups within the community.

Question 2: What were your initial thoughts upon hearing about the implementation of this program?

Follow-up question: Did you have any discrepancies between your expectations and the realities of seeing the plan in action?

Justification: We wanted to discover what possible hesitations there are regarding participating in a sustainable school lunch program.

Question 3: Are there any aspects of the program you find to be remarkably tedious or difficult?

Justification: We could identify parts of the program that do not seem to be beneficial or that may need to be reworked.

Question 4: Are there any parts of the program you have found to be especially beneficial?

Justification: We could identify aspects of the program that seem to work and have worked in the past.

Question 5: In your opinion, how could the program improve?

Justification: We were able to get constructive feedback by the result of first-hand experience.

Appendix E: Script for interviews with sustainable food experts

Question 1: What role have you played in implementing or spreading awareness about sustainable school lunch programs?

Justification: This helped us better understand the level of evolvement of this individual.

Question 2: What inspires you to carry out your work?

Justification: In asking this, we learned why people feel passionate about sustainable food programs.

Question 3: What do you consider the biggest obstacles in getting a program into a school cafeteria?

Justification: We wanted to be aware of the hoops that these individuals must jump through when going about starting a school lunch program.

Question 4: What are some suggestions you have heard to improve the program?

Justification: We learned about some of the negative feedback received as a result of implementing a program.

Question 5: How do you manage setting up the distributor connections to get the food into cafeterias?

Justification: We learned more about what goes into setting up a connection with a distributor of sustainable food.

Question 6: Did you implement any kind of training for cafeteria staff or teachers? If so, what did this look like?

Justification: We wanted to see what training is necessary for school staff as a result of starting a sustainable lunch program and if it is useful.

Appendix F: Interview summaries with fishery contacts

In this appendix, we will summarize the general information we learned from each interview participant, as well as outline the summaries of each interview transcript.

Keith Kamakawa discussed his work as a fishery management specialist at NOAA, targeted species for commercial fishers, sustainability guidelines that commercial fishers follow, his thoughts on getting seafood in school lunches, and the barriers he foresees will accompany that.

Jennica Lowell-Hawkins of Ocean Era explained how the pricing of fish produced by aquaculture is determined. She added her belief that, in their current state, no aquaculture facility in Hawai‘I can supply all DOE schools.

Neil Hirasuna and Jeremy Aoyagi from Fresh Island Fish, a distributor with its own longline fleet, explained how tourism affects the seafood demand and what causes variation in supply in Hawai‘i. They believe a ‘sea to school’ program could exist if the contract between the distributor and school is long-term and benefits both parties.

Stephen Ueda discussed the Suisan Company’s role as a food distributor, their current customer base, details of their experience getting a contract with HIDOE, his thoughts on seafood as part of school lunches, and opinions regarding ta’ape as a potential species and its challenges.

Josh DeMello, a fishery analyst at the Western Pacific Regional Fishery Management Council, explained some potential challenges for a ‘sea to school’ program, including pricing, processing, and determining the most suitable species to be used.

Jason Brand spoke on the goals of Kunia Country Farms and their grow methodology, their aquaponics system involving lettuce and tilapia, success with taste testing with HIDOE, the farm’s sustainability goals, and expansion goals.

Dick Jones elaborated on the environmentally conscious aspects of the aquaculture industry, how aquaculture can support food security and self-sufficiency, and his opinions on tilapia as a potential species for school lunches.

Dr. Bradley (Kai) Fox detailed Sea Grant’s education extension efforts, aquaculture vs. wild caught safety and health concerns, the state’s seafood supply and statistics, and opinions surrounding adding tilapia to school lunch menus.

Karlotta Rieve discussed her work regarding restorative aquaculture at Hatch, as well as with bivalves and seaweed and incorporated challenges.

Keith Kamikawa – NOAA Fisheries Management Specialist – 1/18/22

- Does work on commercial fisheries documents
    - Ex) bigeye tuna longline – helped with some regulatory and environmental documents
- Most of time is spent working with commercial fisheries but a small portion (5-10%) of his work is with recreational fisheries
- Species targeted
    - Invasive species not targeted because ecosystems are different for pelagic fisheries (longline goes far offshore)
    - Deep-set fishery targets tuna
    - Shallow-set fishery targets swordfish
    - Other species are sold that are bycatch – they are still economically valuable but not a main target of the fishery
- Guidelines/methods to ensure sustainability
    - In Hawai‘i, red fish is important (like tuna)
        - Towards the end of the year the fishery begins to reach its annual catch limit (ACL), so the price of the fish goes up
    - Some fish have annual catch targets (ACTs) to avoid hitting the ACL
    - Division observers – people that go on boats and record things like interactions with protected species
    - Making sure they aren’t catching too many fish, catching the right fish, and mitigating interactions with protected species
- Commercial fishers...
    - Are mandated to report catch numbers
    - Are required to have a commercial marine license (CML), which has a monthly reporting requirement
- Questions when thinking about getting seafood into school lunches
    - Does the school want seafood in their cafeterias?
    - Would the kids eat the seafood?

    - What are the barriers in making it work?
    - What are the benefits?
    - Is there a demand?
- Obstacles in getting seafood into schools
    - The processing of seafood
    - Must be handled properly to avoid sickness
    - Equipment (proper freezer, certified kitchen, etc.)
    - Having a partner to help with processing and distribution
    - Making the fish palatable for students

Stephen Ueda – Suisan Company President and CEO – 1/26/22

- Suisan is currently a broadline food distributor in Hawai‘i – all kinds of foods to restaurants, hotels, etc.
- Target species – tuna
- Big species used to be aku, but it got less economical
- Ahi – bigeye tuna and yellowfin tuna
- Suisan company does not export, but most Honolulu businesses do
- Current customer base:
    - Buy directly from supply, which mostly consists of overnight fishermen
        - Go out the day before then come back
    - So supply is from smaller individual fishermen with smaller boats (than compared to longline fishermen)
    - Sell directly to the public through their retail market, selling ahi and filets
    - Wholesale – retailers, restaurants, and hotels
- Experience setting up contract with DOE – hasn’t dealt with them in about 10 years
    - DOE used to send out a bid before the school year started and send out a list of all the products that they thought they would need to serve in lunches
    - Would be set on a certain menu schedule planned for the year – specific and the products they were looking for
    - Suisan team would source products and submit their selling price
    - When Suisan did win the bind, some challenges were...

        - Winning did not mean the school took whatever you had on the bid – so even if you win, they might not even use it – but the bid said that you have to stock it – so you would end up with unused products at the end of the year
        - HIDOE also would not pay for the goods until they used it, so if they had required something for the year and didn't use it, you were out the money it took to buy it and store it.
            - Unused inventory was sold on or discarded
        - Not clear on the menu, they just give a volume – so you just guess how they are going to use the products
    - School lunches would require CN [child nutrition] requirements
- How did the DOE address some of these issues?
    - One distributor to service all the islands – one primary distributor or subcontract with other distributors
- Do you see a future where local seafood makes it into school lunches?
    - Yes, if you have a dedicated cafeteria manager that has the proper resources and has connections with suppliers
    - Must have the volume to make that many meals and a reliable supply
- Challenges with ta'ape
    - Small species, not a strong supply
    - A lot of labor for a little piece of meat
    - To preserve freshness, frozen is important

Jason Brand – Kunia Country Farms Co-Founder – 1/31/22

- 3 goals of Kuna Country Farms
    - Grow food locally
    - Grow food sustainably
    - Reduce food prices for the island
- Grow methodology = zero impact farming
    - Do not use any water other than rainwater
    - Do not use any power other than solar
    - Do not grow into the soil itself – nutrients there for future generations

- 5000 pounds of lettuce and 40,000 pounds of fish every week
- Aquaponics system between lettuce and fish – closed-loop system
    - Fish is the nutrient source for the plants
    - Plants become the filtration system for the fish
    - Filtration mechanisms to keep cold blooded fish diseases from getting into plants and ultimately into warm blooded mammals
    - Cost of fish food = cost of general fertilizer
- Their business is lettuce-centric – so fish are viewed as an expense center (but has been able to make them profitable)
- In the process of scaling the farm 10x – expanding because they can't keep up with the demand on the lettuce side
    - 5000 à 50,000 pounds of lettuce every week
    - 40,000 à 400,000 pounds of fish every week
        - They grow tilapia – so this number outsizes Hawaii's demand for live fish
- Recently did a joint panel with DOE of taste testing products that could go into the school system
    - At elementary and high school level – promising results (upper 80% in terms of acceptance)
    - Tested both nuggets and sticks
    - Tested different flours to try to meet standards from the DOE of what must be nutritionally provided in a school lunch
- Bulk of fish sold live and most likely end up in Chinatown – only a handful of high-end restaurants that will take larger filets
- Started farm with catfish, which have a similar market price as tilapia
    - Catfish need to be artificially inseminated and do not have scales (anytime you have to supplement the crop with a chelated or salt-based product, the catfish die)
    - Tilapia breed readily (especially in Hawaii's climate), are hard to kill (hardy and fairly disease resistant)
        - Just need to pay attention to oxygen levels
- Marketing tilapia to get around stigma – call the product another name (like Hawaiian sunfish)

- Have started to work with crayfish
    - Don't get enough output with regard to waste versus fish due to the size of the crayfish
- Lettuce goes everywhere but mostly to grocery stores
- The farm's sustainability goals (will benefit both plants and fish)
    - Optimize productivity per square foot of land use
    - Recycle as much as possible
    - Minimize footprint with regard to water and power
- Supply contract with DOE in the future?
    - Thinks that lettuce can go into the DOE at anytime
        - Starting large bulk taste testing
        - USDA certified lettuce producer
    - Targeting for 2023-24 for tilapia products to enter the school system
        - Fish sticks and fish patties are already USDA certified products, the only hurdle for Kunia to overcome is becoming a certified manufacturer
        - Already have a good relationship with HIDOE

Dick Jones – Blue Ocean Mariculture CEO – 1/20/22

- What makes methods environmentally conscious?
    - Fish indigenous to the local waters
    - 93% of fish meal and fish oil come from byproduct of fish that were caught and processed for human consumption
        - Other 7% from sustainable sources
    - Monitor effluent from the cage
    - Certified by the Aquaculture Stewardship Council for environmental and social responsibility (only one in the U.S.)
    - Reports in public domain
- How does aquaculture help support food security and self-sufficiency?
    - Consistency – price, quality, availability
    - Marketing of good aquaculture is very important – get people eating good fish again
- No current contracts with businesses for fish supply

    - More about relationships, and supply/demand driven
- Supply fish to local schools?
    - Would love to, but their fish is a premium style (Kanpachi)
    - More opportunity to look at different cuts of product
    - Currently, (before COVID) bring in tours from schools, education perspective
- Species that might be a better fit for schools?
    - Tilapia
        - Tilapia farm, Kohala Mountain on the big island
    - Minced white fish into fish sticks or patties
- Blue Ocean would love to give back to community by supplying schools, but would want to combine it with tours or educational classes (symbiotic)

Fresh Island Fish – Neil Hirasuna (Chief Financial Officer) and Jeremy Aoyagi (Director of Compliance) – 1/25/22

- Seafood processor
- Own and operate own longline fleet
    - Own bait and supply shop as well as fueling company
- Supplier vessels (with bait, gear, fuel) go out for 20 days and come back to unload at Pier 38
- Fish comes into facility, process it, cut it into filets and loins, and then transfer to customer base
    - Customer base currently consists of restaurants and hotels
- Contracts with businesses? How are connections established?
    - Face to face interactions with sales representatives and sales team (with chefs, general managers)
    - Contracts are based on a competitive bid system
        - Send pricing daily, they pick the lowest price fish that's delivered the next day
- Process of distributing fish from the docks to the markets
    - Offloading fish onto carts and into facility
    - Heads are chopped off, and tails are sliced (to ensure accurate reading)
    - Fish is graded and passed through the weighing scale

    - Placed in storage room or into processing room for putting, fileting, and filling
    - Wrapping station – wrapped in paper towels and plastic wrap
    - Completed lot goes to packing station
    - Into distribution boxes for O‘ahu sales or transportation to other islands
- Sustainability guidelines followed
    - Seafood hassle program
    - Safe transport, safe facility
    - All catch is reported to NOAA to monitor fishing quota
    - Report catch to state DOAR – for scientific studies
    - Hawai‘i Longline fleet in the process of being MSC certified
        - Big eye, yellowfin, ahi, pacific swordfish
- Catch targets and limits
    - Set annually
    - Reviewed by NOAA and Wespac
    - Stock assessment every 3 years
- Environmental regulations?
    - Ultra-low sulfur diesel for all fishing vessels
    - Clean Water Act for fishing vessels
        - Oil consumption and dumping
    - Protected species
    - Turtle patch counts monitored
    - 20% observer coverage
    - Shallow set or swordfish have 100% observer coverage
- Target species?
    - Deep-sets - big eye and yellowfin
    - Shallow-set - swordfish
    - Bycatch – Ono (Wahoo), Striped Marlin, Blue Marlin, Monchong, Opa
- Is there an excess of supply?
    - Hawai‘i demand is based largely on tourism
    - Supply impacted by number of fishing vessels

    - Supply also impacted by number of imports that come in from Marshall Islands, Vietnam, Australia
    - COVID stopped many of those imports
    - 250,000 or 500,000 pounds of fish donated to Hawai‘i food bank from Hawai‘i longline fleet because demand had dried up
    - Fresh Island fish donates 2-300 pounds per week to Lanakila Pacific
    - Hard to start a program like this because it is all based on the desire to make profits
    - A contract would be essential for a program like this so that there is no withdrawing
- Market value of fish changes often
    - Some bycatch species drop to less than $1 per pound
        - Cheaper than chicken or beef
    - Broad range of species of fish may work for such a program
- Bycatch? Waste?
    - Heads are chopped off, grinded up, and sold to fertilizer manufacturer
    - 10% bycatch currently, but typically 30-35% bycatch
    - 100% of fish is sold just in many different forms
- Would having a school as a contracted repeat customer be useful for demand?
    - Yes, consistent demand is easier to plan
    - Look long term - over the whole year did you make money?
        - Both sides should win
- Could prove to the state that the Hawai‘i longline fleet is key in providing food security
- Industry of fresh protein - need to connect to public interest

Dr. Bradley (Kai) Fox – Sea Grant Aquaculture Extension Specialist - 2/1/22

- Land grant system
    - Extension agents and specialists
    - Liaison between the public, researchers, university system
    - Transfer technology to the private sector
- Education Extension Efforts
    - Aquaculture, aquaponics beginner farmer training program

    - Build, repair, and train teachers in HIDOE to do aquaponics integrated STEM programs
    - Community groups with Hawaiian Fishponds
    - Saltwater growers for aquaculture
    - Big Island private sector - micro algae, octopus, fish, clams
    - Food aquaculture - freshwater based - catfish, tilapia, giant gourami
    - Helping growers grow as well as do workshops
- 30% by 2030 - state mandate
- 2014 - aquaculture production surpassed wild-caught in terms of seafood in the world
    - If there's more people, there needs to be more aquaculture
- Hawai‘i eats about three times the national average of seafood in the U.S.
- Seafood is the second most imported product, behind oil, in the U.S.
- Supply is a problem, if you want to put it in schools, you would have to scale it up
- Aquaculture is safe
    - Microplastics and nano plastics in wild-caught fish
    - Mercury in wild-caught just like farm raised
    - Effluent
    - Aquaculture has a bad perception – there is definitely safe, sustainable ways
- Aquaculture does not currently have the supply to accommodate schools, but a few years to scale up and it could
    - Still must be a fair price
- Socio-economic aspect
    - Regulations
- Antibiotics, chemicals, effluent waste from imported fish
- Must make it fair to local growers in order to up scale
- Fish food from carbon dioxide and carbon monoxide
- Tilapia would be a good species for school
    - Plain taste
    - Easy to make
- No labeling law internationally
    - Eating tilapia, but called something else

    - That would be how to get it into the market

Karlotta Rieve – Hatch Innovation Services Restorative Project Manager – 1/24/22

- Restorative Aquaculture Project Manager at Hatch Innovation Services
    - Consultancy branch of Hatch
        - Aquaculture accelerator
        - Venture capital firm
        - Focus on innovation and sustainability in the industry
        - Works with tech startups or individual entrepreneurs
    - Main clients
        - Corporations
        - Government
        - Projects needing a strategy advisor
- Specific focus is opportunities and challenges of restorative aquaculture
    - Contracted by Hawai‘i Department of Agriculture
    - Report directed towards legislature
- Restorative Aquaculture
    - Aquaculture with direction ecosystem benefits
        - Production is not just focused on food, the species harvested have possible climate change mitigation potential
        - Can help deal with some of the harmful agricultural runoff and improve the water/ecosystem quality and health
    - Hatch project is specifically focused on bivalves and seaweed
- Bivalves and seaweed
    - Potential use is to help supplement the food supply and attempt to work towards solving the food insecurity issues on the islands
        - Seaweed contains lots of healthy omega-3 fatty acids as well as having a very rich nutrient profile, especially useful for children
    - Challenges of getting it into modern cuisine
        - Not really a huge part of the current palate but seaweed was traditionally part of the Hawaiian diet
        - Hard to scale production

- Because of permitting and licensing, it is very difficult to get things into the oceans around the islands, specifically seaweed and bivalves, larger fish have had more success
- Wild-caught is not scalable and has sustainability questions as well as harvesting certain mollusks presents several dangers to workers
- Currently there do exist hatcheries for oysters on the islands but they are shipped to the mainland once they leave nursery stage only to be sent back to the Hawai‘i once they are market ready
- Water quality nearshore is challenging for the ecosystem because of nutrient runoff from agriculture

Jennica Lowell-Hawkins – Ocean Era Finfish Program Manager – 2/1/22

- Ocean Era is an aquaculture research company with a focus on making that research applicable to commercial industry
    - Increase efficiency of fish/seaweed production
    - Increase sustainability of fish feed by looking for novel ingredients
    - Partners with other private companies and universities to do the search
- Ocean Era wants to get a new commercial farm started on the islands in the near future
- Works both with finfish and seaweed
- Seaweed at Ocean Era is not just for food consumption
    - Funded by US Dept. of Energy to look into growing seaweed for biofuels
    - In the next couple of months a demonstration offshore seaweed array will be created near Kona
- Does everything from writing grant proposals to making new tank covers
- Started with Kona Blue Water Farms in 2006
    - Offshore finfish farm and hatchery in Kona
    - Worked as research manager
    - Also did work examining the environmental interactions of the offshore farm with its immediate environment
    - Dealt with managing and getting permits
        - Key element of aquaculture in the US

        - Challenge but helps to encourage sustainability in the industry
    - Offshore farms in state or federal waters must do a lot of environmental monitoring to make sure there are no seriously adverse impacts
- In 2017, worked with NOAA at the National Ocean Service in NC with the Coastal Aquaculture Siting and Sustainability program
    - Deep examination of aquaculture's interactions and relationship with the environment
    - Examined permits for farms looking to go into federal waters
- How to run/start a fish farm
    - At the beginning nothing can go offshore
        - Starts on land
        - Land based facility that can breed and supply small feed fish (like fingerlings)
        - Brood fish tanks (50-60 metric ton tanks) to hold the fish used for spawning
            - 2 at Ocean Era
            - ~8 at Blue Ocean Mariculture
                - Ocean Era uses Blue Ocean's kanpachi brood tanks
            - Sometimes spawning is simple (fish just do it on their own), sometimes more complex (requiring hormonal induction, light change, or temperature changes)
            - Modern aquaculture species normally have small eggs
        - On shore nursery facilities for larval fish
            - For raising the larval fish once they hatch
            - Requires tight biosecurity because they are sensitive to any bacteria or pathogens, meaning lots of filtrations
            - Species like kanpachi spend a month to a month and a half in this phase
        - Larval fish feed raising facilities
            - Small fish species like rotifers, artemia, and copepods
        - Tanks for juvenile fish

            - After the larval stage until month three of life
            - Larger tanks with higher water flow
    - After three months fish can go into offshore cages
- Species choice and farm location
    - Depends on characteristics of location
    - Hawai‘i has expensive electricity and little available land but large deep oceans so offshore farming makes sense
        - Filtration is not a concern in offshore, current carries water through the cages
        - Space constraints make the hundreds-to-thousands of six-to-ten pound fish less viable on land
        - Warm water marine finfish are a great option for Hawai‘i
    - Aquaponics
        - Efficient use of freshwater, but still needs lots
        - Need food input
    - Feed ingredients are part of the equation as well
        - Ocean era is working with right now is kyphosus vaigiensis or brassy chub and nenue in Hawaiian which are herbivorous
            - Can survive well on the diet of tilapia
            - Would hopefully be part of the new Ocean Era commercial scale farm off O‘ahu
        - Changing up/diversifying the feed supply can help more holistically use agricultural products or fisheries byproducts that would kind of go into their feed
        - Salmon and kanpachi are carnivorous species, requiring the raising of feed fish
    - Mahi mahi is also a species under research by Ocean Era
- Processing
    - A larger company would be able to do their own processing
        - Vertical integration

        - Allows the retention of the byproducts that might be useful for fish farming but not for the commercial market
    - At the start or for smaller scale companies outsourcing processing is more viable
        - Sell the whole fish to a processor or distributor
        - How Blue Ocean Mariculture and what was Kona Blue do it
    - Higher value fish and cuts get turned to high market value filets, but those lower value cuts and fish can be made into something cheaper like a fish stick
        - Kids still get the really good products and the healthfulness
        - Growers or processors can still sell the higher end product
    - Processing challenge is not just isolated to seafood in Hawai‘i
        - Also exists for beef and other proteins and some produce
        - Hawai‘i has the growers and consumers but less of the processors
- Pricing
    - Initial cost of product will be quite high
        - It takes 5-10 years to get the operation up and running smoothly
    - Fish like nenue would eventually be able to be priced very competitively pound for pound with wild-caught tuna
        - Aquaculture, once up and running, can have lower costs, especially with nenue or other herbivores not requiring costly feed fish
            - Feed costs can drop even further with more vertical integration, farming the seaweed used as feed, and it also allows for another revenue stream
    - New industry always starts with the higher end product
        - Start with high value species like kanpachi
        - Slowly diversify and work its way down to have more product available at different price points
- Industry scale
    - Salmon is easy to get into schools because billions of pounds is produced per year
    - Blue Ocean Mariculture probably produces over a million pounds per year, but that’s not necessarily enough for the DOE
        - 160,000 kids in the district with a target to have a lunch for each student

Josh DeMello – Western Pacific Regional Fishery Management Council Fishery Analyst - 2/8/22

- Has been at WPRFMC for about 20 years
- In charge of their island fisheries program – nonpelagic species
- The fishing community is all based on the islands and many of these communities are dependent on fishing and fisheries
    - Places like American Samoa (or even Hawai‘i) had have that link to seafood broken
    - Now dependent on canned goods, processed foods
    - It is WPRFMC’s hope to reestablish that link
- Attempts in American Samoa to start providing fish to the DOE there
    - Seemed like an easy process, with the biggest problem being certifying that the fish was indeed fresh and good for you
    - Went through the whole process and the government just needed to sign the papers certifying it
    - The program ‘died’ in the government’s hands
- Possibility of a ‘sea to school’ program
    - ‘Unless the price of fish comes down, it is going to be tough’
        - Many fisheries can sell their product for more than they would if they sold it to a school
    - A middleman needs to process the fish
- He is also the aquaculture coordinator at WPRFMC – they manage fisheries in federal waters, like aquaculture places
    - Want to provide more funding for research in aquaculture
    - Some legal obstacles with aquaculture
    - Fish from aquaculture are often ‘muddy, soft flesh fish’ - could be hard to get kids to eat it
    - But tilapia is so popular because it is white, flaky, and tasteless
    - Problem with aquaculture – using five pounds of fish to raise one pound of fish (not sustainable)
- Overfishing control rules

    - Wild-caught fish – overfishing and the status of the stock
    - A lot of fish that come in are internationally managed
- Ta'ape – project that tried to remove them from reefs
    - Net them and pull them out
    - Some were sent to California to be sold
    - Problem: could not harvest enough
    - ‘Probably past the point of being able to eradicate them’

Appendix G: Interview summaries with sustainable and school food experts

In this appendix, we will summarize the general information we learned from each interview participant, as well as outline the summaries of each interview transcript.

Dr. Albie Miles of the University of Hawai‘i West O‘ahu detailed what makes Hawaii's foodstuff production so complex, given the unique circumstances that result from the island's isolated geography.

Sophie Scott from the Gulf of Maine Research Institute described why local seafood distributors struggle to compete in a global marketplace and how the marketing of fish can give the illusion of a local product, even if that is not the complete truth.

Andrea Moore discussed the imports, exports, and food security issues in Hawai‘i, efforts regarding the 30% local by 2030 state mandate, Mililani High School’s response to the ‘farm to school’ program, obstacles to that program, and how student involvement impacts such a program.

Gloria Pilar spoke on the extensive efforts involved by Mililani High School’s kitchen staff and the food preparation necessary.

Greg Christian discussed his work with Beyond Green Partners and more specifically his help with the ‘farm to school’ program at Mililani High School, including kitchen efficiency and staff training recommendations.

Alan Lovewell explained his work with Real Good Fish and the Bay2Tray program, he also spoke on challenges with implementing such a program, ways to incorporate an education component, and stressed the importance of parent involvement.

Lydi Bernal discussed the Farm to School Hui, its curriculum, experience working with the DOE, and obstacles managing sustainable food programs.

Alex Narrajos discussed her work with Kokua Hawai‘i Foundation, their ‘farm to school’ efforts, obstacles she sees with ‘sea to school,’ Chef Hui experience, and educational curriculum.

Kevin Chang discussed KUA’s community-based stewardship approach, their fishpond’s education efforts, restorative aquaculture, and the mullet as the fishpond’s current species focus.

Herb Lee spoke on stewardship, awareness, and education, culture-based education, the current productivity of Hawaiian fishponds, and the current farmed species at the pond.

Mark Noguchi, Food and Sustainability Curriculum Specialist at Punahou School, offers his perspective on sourcing local ingredients for lunches at a private school.

Andrea Moore – Mililani High School Vice Principal – 1/26/22

- Imports vs. Exports and Food Security Issues:
    - Shipping cattle live to the mainland to be processed to be shipped back here
    - Hawai‘i has transitioned more and more to gear everything towards tourism and the ready dollar
    - Hawaii’s food security depends on imports and supplies stored in warehouses
        - “And that’s like two weeks worth, if something happened, we had no planes and no ships coming in, we’d be out of food in a couple of weeks”
    - The legislature came up with the 30% local bite by 2030 efforts
        - The only way to make that happen would be to start writing contracts with farmers
        - Farmers would love to supply but they need contracts
    - The tourist areas (Waikiki) are currently getting priority treatment for fresh produce and seafood because tourists can pay the most for it
    - Imported produce is not as fresh as it probably took 3-4 weeks to transport
    - In this time you have to pay for shipping, handling, and packaging
    - They could make the transition to local sales
        - Could negotiate a price locally to be able to do fresh and could build the demand in schools with a little marketing
- Farm to School Kitchen logistics:
    - Preparation is not an issue if you invest the time and money into properly training the people in the kitchen
    - Most of the people that work in the kitchen, they all cook at home, and they all cook incredible things. And they cook for each other , but they can’t serve it to the students. So a lot of these cafeteria staff do have the skill set.
    - The cafeteria staff are working hard for very long hours for a low amount of money and job security
    - An issue is that DOE doesn’t want to invest in full time kitchen staff employees and instead hire part timers. The problem with this is that in Hawai‘i you cannot

afford to work on a part time salary and so working in school food services is not a sustainable job for most people and so workers can't commit to the hours required to do the job or can't commit to the job long-term
    - Hawai‘i school food services are hiring immigrants that will work for less because they have several full-time jobs
    - As a result, they often end up with kitchen managers and leadership that don’t know how to run the kitchen ‘like a restaurant’
- How transition into new program was managed - Greg from Beyond Green Partners came to Mililani High School
    - Interviewed students and asked for suggestions and preferences from students
    - Marketed the new food changes to the students
    - Got the student body involved in marketing - the student council would organize marketing efforts and would text out pictures of the lunches to advertise and students got very excited about the new menu
    - Greg just sat in the kitchen for a few months observing how this were working and then eventually started making suggestions for trying new things and eventually they were able to start using all of the skills that they had in the kitchen
- Foods that students have responded well to/ would like to have in lunches
    - Kalua pig
    - Spam musubi (students want it but DOE does not like idea of spam)
    - Corn chowder with bacon (one of student favorites)
    - Students love fresh lettuce for salads (Mari’s Garden)
        - They were eating so much lettuce that they had to start pre-packaging salads
    - Kimchi
    - Shrimp + Tuna
- Foods students have responded poorly to:
    - Frozen chicken patties (when they replaced it with fresh chicken students loved it)
- Obstacles in getting seafood into schools:

    - A lot of kitchen staff are resistant to these changes because they do not want to invest the increased amounts of work required to prepare and cook with fresh ingredients if they aren't getting paid more than if they are just opening cans
    - The status quo with procurement from the DOE limits the potential for contracts with local suppliers and distributors
        - "A lot of the fisheries and farmers, if they had a guaranteed contract, we are the biggest restaurant in the state and they could get contracts and be producing, they could meet our demand, and probably meet a much better price rate. And then they could continue to jack up the prices in Waikiki because the tourists will pay for it."
        - "In Hawai‘i people in school food service, are pretty much this is the way we've always done it, this is what we do and we're not going to do anything else."
- Responses to Changes:
    - Cafeteria staff take pride in their work and refuse to go back to opening cans of processed food
- Student relationship with seafood:
    - In student surveys, don't say 'Do you like fish?' say: 'how often do you eat fish?' or 'what kind of fish do you like?' because students do like fish
    - A lot of these kids may not be able to afford a lot of especially fresh fish at home
- Suggestions and Advice:
    - There has been talk about centralizing the cooking in production kitchens that will process and prepare the meals in a way that the kitchens could handle (ready-to-bake products or accessible ingredients) and then delivering them to the schools for lunches to prepare and serve
    - Very important to provide education and training for personnel
    - "Play on the legislature… politicians jumped all over the 'Aina Pono project" … "once people find out about the project, every legislator is going to want to talk to you"

Gloria Pilar – Mililani High School Cafeteria Manager – 1/26/22

- Mililani Farm to School Kitchen Logistics

- The menu for the schools are determined by a dietician at the DOE
- Currently Mililani High School lunch program only occasionally serves tuna in the lunches → this is the most familiar fish to the students and they like it more
- The Mililani High school food service waste management systems include composting any food not eaten for an on campus garden system (big effort to minimize waste produced in the kitchens)
- Kitchen Staff prepare all of the ingredients (cut, grind, and shred and portion out all ingredients) and cook all of the meals from scratch every day (they always prepare the meal for one day the day before it is served to ensure that everything is ready)
- Kitchen staff start work in the kitchen before 6 am
- The Farm to school program required the purchasing of some new kitchen equipment but a lot of it existed prior to implementation of the program

Greg Christian – Beyond Green Partners Founder and CEO – 1/13/22

- Beyond Green Partners Mission and Projects
    - It is important to 'honor all and respecting all parties when working on sustainability and food system changes'
    - It is important to educate students about the food system and where their food is coming from and how it is produced → teaching students how to grow food
- Organic School Project in Chicago:
    - Put gardens in the schools to teach students about agriculture and growing their own food
    - Nonprofit that they just raised the money for --> people threw money at these projects
- Kitchen Efficiency Expert:
    - Walks into big kitchens in schools, colleges, homes, prisons, elderly long-term living facilities and show them how to better manage money, time, food supplies and other resources to meet the goals that they are trying to achieve
    - Teaches kitchens how to go from exclusively reheating frozen food and opening cans to a kitchen that can handle scratch cooking fresh food

    - Bringing accountability to the kitchen, better leadership skills, and how to own the waste
    - The goal is a zero-waste kitchen which involves measuring and keeping track of food waste, time waste, and unnecessary spending
- Designing an Efficient Kitchen:
    - Zero waste kitchens track food waste, the way that money is spent, and the way that time is prioritized
    - Don't try to force recipes on people. Instead go in and talk to the people in the community that this program will serve and listen to what they actually want in this program and what they would be happy to eat
    - Speak with the cooks and ask them what they want to make and what equipment and facilities they have access to
    - Speak to farmers and producers to understand what supplies exist
    - Learn the rules from all parties including USDA rules, HR rules, Union rules, school rules
    - Learn how to work within these parameters and rules
- Provide training for kitchen staff:
    - Leadership training
    - Accountability training
    - Knife skills
    - How to turn on and off the cooking equipment and appliances
    - How to use equipment
    - How to measure out correct portions
    - Kitchen math
- Obstacles to Overcome in designing a sustainable food program:
    - Schools do not think that they have the resources, time, facilities or skilled personnel to be actually processing and preparing ingredients for scratch cooking meals
    - There is also a fear of trying to change the way things have run forever

        - Example: in Hawai‘i, a cafeteria manager who had worked for 10 years quit her job after Greg was hired to work in kitchen because she did not think that it could be done and was very resistant to change
    - Kitchen workers will also often be extremely resistant to change and might act out in fear or frustration with big changes in their routines
    - It can take months for cafeteria staff to trust the changes and be ready to change
    - People in Hawai‘i do not like tilapia because that's what they ate when they worked in the fields and as such tilapia has a bad connotation in Hawai‘i
    - Schools have limited cooking equipment and workers that are not necessarily going to have a fully developed cooking skill set
    - Deep fryers are not allowed in USDA supported schools
    - They have big kettles that are hard to cook good food in and ovens
- Supplies for the program
    - “The people that run the docks likely have a ton of frozen fish that they do not know what to do with. There are surplus of food, like everywhere.”
    - There are aquaculture farms raising ‘Tilapia’ which are gearing up to produce 40 million tilapia a year
- USDA uses a bid system to procure food supplies for schools:
    - To get this, you provide them with a specific quantity of a certain ingredient for a certain period of time (week, month, year)
    - Tell them the way that it needs to be processed and prepared (ex. 4 oz. filets or 20 lb fish)
    - You then make the request and you get three bids from different vendors and then choose who you are going to do business with
- Student Engagement in the lunch program
    - Challenged students interested in cooking at the school where the program would be implemented to invent new recipes for school lunches that would meet the rules and the best meal was incorporated into the menu for everyone to eat and enjoy → students got invested and excited about the changes and responded very well to new menu

Dr. Albie Miles – University of Hawai‘i West O‘ahu Assistant Professor of Sustainable Community Food Systems – 1/19/22

- Started the SCFS degree program
    - Covers all aspects of food, agriculture, sustainability, public health, including the integration of indigenous knowledge into undergraduate programming
- Studied organic and sustainable agriculture at UC Santa Cruz doing an undergraduate degree in environmental science and education.
- PhD in environmental science, policy and management from UC Berkeley
- Studied agro-ecology at UC Berkeley under Miguel Altieri, a leading agro-ecologist
- Involved in creation of the Berkeley Institute for Diversified Farming Systems and the early stage of development of the Berkeley Food Institute
- Currently researches the food system of Hawai‘i looking for vulnerabilities and sources of food insecurity
- Transforming Hawaii’s Food System Together Initiative
    - Creating/designing a state/regional food system plan/charter for Hawai‘i
    - Goal is to have this plan/charter adopted by the state of Hawai‘i, the Office of Planning and Sustainable Development, and the next governor of the state of Hawai‘i, to lead policy and investment toward achieving the UN Sustainable Development Goals that relate to food and agriculture
    - Direct Summary:
        - “Intended to convene a diverse stakeholder group that is involved in food and agriculture in Hawai‘i, and begin to kind of craft a common vision for the future of food and agriculture in Hawai‘i.”
    - Reasoning:
        - Lots of small-scale, grassroots, or community-based efforts to work on this but no overarching common vision
        - Lots of stakeholders but little to no meeting of all of them to work together
    - Convening project combining research, education, and planning to craft a common vision in terms of public policy, private sector development and the overall development of the food system of Hawai‘i
    - End goal:

        - Create an “integrated state food policy framework”
        - Rather than having the legislature pass acts to do focused efforts that may overlap or compete instead have a unified policy and direction
- Institutional Purchasing
    - Paula Daniels
        - Founder of Center for Good Food Purchasing in Los Angeles
        - Created institutional purchasing arrangements between the Department of Education and the LA school district
        - Worked in a bunch of large cities and states to create institutional purchasing, assessments and protocols for increasing the amount of local organic fair-trade and other kinds of foods that are going into institutions, whether they're Department of Education, schools, hospitals, big corporations, etc.
    - Transforming Hawaii’s Food System Together initiative has just started working on developing the institutional purchasing work
        - Currently none working with seafood yet
        - HIDOE has made a commitment to achieving significantly increased amounts of local purchasing to supply all DOE schools
            - All purchased food needs to fulfill certain nutritional criteria in accordance with the USDA and other boxes to check
    - Real area of expansion for a sea to school program to work (or generally local fish)
- Obstacles
    - International Food System
        - Food production (particularly in industrialized regions) is all about externalizing the costs, mainly the environmental ones
            - Biological simplification of historically diverse agro-ecosystems through green revolution practices
                - Negative impact overall system

- Policy (both national and international) reinforces that, and does not place any price of the social risks (environment quality and public health) associated with industrial production practices
    - For change to happen, these costs need to be addressed
- Example:
    - It is cost effective for a farmer to grow corn and soybean monocultures that leak out tons of nitrate and chlorpyrifos into the Gulf of Mexico, there exists no financial burden on the grower doing that
- Race to the bottom economic model, lowest cost of production will always win in the market

- Hawai‘i Food System
    - Geographically remote
        - Importation of most of the food
            - Agricultural globalization
            - Economies of scale
    - High production costs
        - Price of land is expensive
            - Large speculative real estate market
        - High electricity cost
        - High input costs
    - Limited food processing
        - Infrastructure is still setup for plantation agriculture
            - 100-200+ year legacy of plantation agriculture of sugarcane and pineapple
            - Only relatively recently has that been stopped
                - Moved overseas to places where environmental and social costs can be better externalized, meaning it is more profitable for multinational corporations
    - Hard competition

- Multination companies can move overseas where costs are low (can pay much less, less environmental oversight, etc.) and import into the high-end market in the US
- Difficult for farmers to compete due to the high cost of production in Hawai‘i
    - Only sector where they hold any real market share is fresh fruits and vegetables

Alan Lovewell – Real Good Fish CEO and Founder – 1/28/22

- Grew up in Martha’s Vineyard, MA and was quite embedded in the fisheries and fishing there both as a recreational fisherman and through his father who was a waterfront journalist
- Taught sailing and leadership in Baja, Mexico where he became interested in the relationship between the coastal communities and the local fishermen versus the globalized nature of the seafood supply chain
- Business was inspired by groups like Gloucester's Fresh Catch and other community supported fisheries which first started in 2007
- Root of Real Good Fish is the idea to do a better job connecting people to seafood and where it comes from which really can be a strong community builder once the right elements are in place
- Day-to-day work is to create access to this local seafood without changing how people get access to it while improving over the existing supply chains
- Bay2Tray
    - Manifestation of Real Good Fish’s interest in the social equity side of seafood, looking at who gets access to seafood
    - Current system of fish in schools
        - Fish sticks at best from Alaska and often from Russia and China are not great at building a strong community
    - Placing local seafood on a tray can help build those communities
    - Provides the opportunity to inspire, educate, and reinforce the idea that the children are active members of their communities and can (and should) play an integral role

    - Bring meaning to the seafood they eat and be conscious of where it comes from
- Challenges
    - Price point
        - Good local fish is often expensive, especially so that the fishers are paid enough
        - Bycatch is a way around that
            - Fish that is not very valuable but is still quite prevalent
    - Perception that kids do not like seafood
        - Parents, staff, admin, institution (sometimes the kids themselves) say that kids do not like seafood
        - But often times kids really do like seafood a lot, as long as it is good seafood
        - "For us, it was like, let's give them fish tacos, who doesn't want a fish taco, I can almost guarantee you that […] any kid in any school in this country would love a fish taco."
    - School infrastructure/equipment
        - Lots of schools do no have the ability to prepare raw foods
        - Most school "kitchens" are primarily reheating operations
        - Little capacity for scratch meal cooking
    - Management is district wide rather than individual schools or some smaller grouping (this is an issue of particular importance in Hawai‘i because of the entire state being one district)
        - This is all highly contextual, what fish can be supplied at a given time fluctuates, especially with regional differences
    - Possible solutions
        - Create a local fish nugget, burger, etc. that can be made in a central/commercial kitchen and reheated in the schools
- Frozen
    - "Basically essential"
    - Helps flatten the supply variability by having some in stock frozen
    - Whatever the species or product is, it must be freezable

- Education
    - Started with school visits, finding interested teachers and bringing a fisherman into the classroom to teach about fishing, Monterey Bay, and the fish industry
        - Paid them, recognize their time is valuable
    - Eventually outsourced to Monterey Bay Sanctuary because of their existing education program that performs similar function
    - Not a requirement for schools receiving local seafood (and the opposite wasn't either), but it was ideal for the two to go hand in hand
    - Learning about what you eat and eating what you learned about helps build that direct connection
- Guidelines
    - Must follow food safety guidelines and be processed in certified kitchens and facilities
    - Permits must exist
    - Cannot have fishermen fileting the fish in their home kitchens or on the boats
    - Check all the boxes and follow all relevant guidelines
- Connections
    - Real Good Fish is a facilitator and connector between people, businesses, and other resources
        - Built the connections and framework
    - Didn't provide boats or facilities
    - Handles distribution, takes that large bottleneck onto their own shoulders to prevent either end from needing to worry about it
- Get parents and faculty involved
    - PTA groups have lots of sway
    - If the parents set their mind to something, it will likely get done
    - Bureaucracy and institutions hate having angry parents and angry workers
- Strategy
    - Find a specific school and have it domino throughout the district
    - Make sure all boxes (sourcing, pricing, processing, kitchen, etc). are checked before rallying the parents and teachers

        - Prevent momentum from slowing by facing bottlenecks early
    - Get a grant from the USDA or from a benefactor, show that there exist resources already, take the weight of the cost away from the DOE initially

Lydi Bernal – Farm to School Hui Coordinator – 1/24/22

- Hawai‘i Farm to School Hui is Hawaii’s statewide ‘farm to school’ network
    - Hui is a Hawaiian word meaning partnership or group
    - This network is a program of the Hawai‘i Public Health Institute, which is a nonprofit organization
    - Formed in 2010 with the mission to strengthen Hawaii’s ‘farm to school’ movement
    - They want people to understand that ‘farm to school’ includes not only food improvements through local procurement but also gardens and farms on school campuses – getting students involved with food education
- She started her work in 2006 with a local nonprofit, Kokua Hawai‘i Foundation
    - They started a ‘farm to school' program called ‘Aina in Schools (‘Aina = lands and waters that feed and sustain us)
    - Teaching students at elementary schools in gardens addressed issues such as overdependence on imported food, childhood obesity, and lack of student engagement in learning
    - Students were excited to be outside and would eat whatever they grew in the garden
- Does work with policy advocacy and development
- Farm to School Hui works on curriculum and professional development offerings and resource development and sharing
- October 2021 – launched the Hawai‘i farm-to-school toolkit
    - Hub for educators to find resources on local food (ex. ocean-based learning and food sourcing)
- If the students have a connection to a food that is being served, they are more likely to eat it
- The school food system is internal to the DOE, so Farm to School Hui works outside the DOE but partners with them

    - Will advise them on next steps for local procurement but cannot make them do anything and doesn't know everything they are up to on their end
    - This effort should be the responsibility of one individual position and not tagged onto an already existing role (it would be too much work)
    - DOE currently has the funding to hire two farm-to-school coordinators in their Office of Facilities and School Food Services Branch – but they have not acted on that
        - There was someone in that position who left in August 2020, so that position has been vacant since
        - This role would be the person building relationships with suppliers and producers and providing assistance to the suppliers
    - How do you source to the DOE?
        - Charter and private schools might have more flexibility when it comes to food sources than the public schools within the statewide school district
        - Independent schools are coordinated under the Hawai‘i Association of Independent Schools (HAIS), so they are not limited to the same rules the DOE needs to follow from the USDA and the State Procurement Office
        - There are a lot of specifics regarding food and procurement that outsiders don't have access to, so the change needs to start within the DOE
- Tilapia – have a history of not being desirable to eat because of their hardiness and that they live in polluted waters
    - However, they do great in aquaponic systems
    - Bland-tasting fish – more palatable for children
    - Good feedback in testing tilapia fish sticks in several schools
- Act 175 from 2021 (HB 767) – established the farm-to-school program in HIDOE and set a goal of 30% local by 2030
    - Holistically proposes the program will improve student health and accelerate garden- and farm-based education
    - Mandates there being a farm-to-school coordinator
- Obstacles in creating and managing sustainable food programs
    - School Food Services

        - How the farm-to-school program progresses is very much based on who is in which position in School Food Services and their take on the topic
        - The proper expertise and solutions exist but those currently in charge...
            - Do not have the expertise
            - Do not understand the solutions
            - Are not willing to partner with the community to figure out a plan
    - Most cafeterias are not equipped with the staff skill level to be processing from scratch – can be alleviated by training
    - Kitchens do not have the equipment needed
    - Some initial resistance by staff but once the change was made, they never wanted to go back
        - Regained pride in nourishing students and feeling valued
        - It's important that the staff is involved with program planning
- Possible solution to kitchens not having the proper skill or equipment – regional mega kitchens or centralized kitchens
    - It would cost millions of dollars to retrofit each kitchen, so instead invest in regional mega kitchens
    - Bulk production that is portioned out and delivered daily to schools, where it can be reheated
- Tracking food waste
    - Not part of standard operating procedure
    - Some of the 'farm to school' pilots included waste audits to track what food was being eaten
    - Windward Zero Waste School Hui – a group of schools that compost waste
- Getting students involved and engaged
    - Have the students grow, taste, and learn the nutritional value of the food
    - Go on field trips to farms or food producers
    - At Mililani High School – the student council got involved in marketing
        - Increases excitement and awareness around the work
- Look to foods that have sustained the people in Hawai‘i

Sophie Scott – GMRI Sustainable Seafood Product Manager – 1/27/22

- Work at Gulf of Maine Research Institute
    - Ecolabel called 'The Gulf of Maine Responsibly Harvested Program
    - Verification Program to verify species from the Gulf of Maine as meeting certain criteria around sustainability and traceability
- Gulf of Main Responsibly Harvested Program
    - Prior to program no MSC certified fisheries → this program filled that gap by providing verification program
    - An additional tool for seafood distributors to confirm with customers, via third party verification, that their product is safe and responsibly harvested
    - Successful because:
        - Denotes responsibility and sustainability
        - Tells the story of a local product (consumers know where their food is coming from)
        - Free program to participate in (accessible)
- Connection made between consumers:
    - Many processors and distributors buy from many different boats and from fish auctions
    - One way that consumers make that connection is through storytelling and marketing
- Relationship between consumers and products:
    - In many coastal communities, people have the assumption that the seafood they are buying is locally sourced
    - 90% of seafood we eat in U.S. is imported and local seafood has to compete with huge global marketplace
    - Sometimes seafood from a foreign distributor will be marketed to customers in a way that makes it seem local
- Student relationship with seafood
    - These ('sea to school') programs should be targeted towards K-12 students:
        - People have a tendency to only try what they know but children are still experimenting with food and haven't quite solidified their food preferences yet

        - Have the opportunity to have a new market for local seafood
        - Opportunity to spread awareness about a wilder knowledge of seafood species
    - In Hawai‘i in particular, there are a lot of kids coming from fishing families and there is a lot of community and culture around it
    - Seafood is ‘an incredibly healthy, nutritious’ food that students do not eat enough of
- Misconception that ‘kids don’t like seafood’
    - “Kids love fish”
        - Anecdotal story about a student telling teachers that they only get hot lunch when it is fish
- Make meals that are familiar to kids
    - Fish nuggets
    - Fish tacos
- Market food to students in a way that will be appealing to them and that they will relate to
    - Put a familiar face behind it
    - Advertise on TikTok or other social media
- GMRI Sea to School Programs:
    - Were able to work in K-12 space by getting USDA farm to school grant
    - Gulf of Maine has three companies that have a local ready-to-bake seafood product for schools
    - Program called Maine Coast Fishermen’s Association called fisherman feeding Mainers where they were buying fish at a good price from boats and giving it to food banks and schools
- Obstacles to ‘sea to school’
- Procurement can be a problem
        - A lot of schools will have a primary vendor that they have a contract with
        - If vendor does not source locally schools cannot really get local food
- Some cafeteria staff are fearful that the kids will not eat the fish and therefore will not serve it

- A lot of schools have the perception that processing and preparing fish filets is too hard → would prefer a ready-to-bake local product (not a lot of processors doing this)
- K-12 schools have nutrition requirements → hard to get a ready-to-bake product that meets these guidelines
- Methods to address obstacles:
- Hired a school chef to actually go to schools and do trainings with how to work with local fish including processing, weighing, and preparing (also done in video form)
- Go into these schools and listen to what teachers and cafeteria staff actually want and feel would improve their experience and make their lives easier (do not try to force something that they do not want)
- Educational curriculum
- There is a gap in this area
- There is a real lack of curriculum around local seafood
- Could fit into different curriculums (science, health, social studies)
- It is very difficult to actually get into schools and modify curriculums
- Talk to teachers about educational engagement plans and how they think that could best be designed and introduced to the students

Alex Narrajos – Kokua Hawai‘i Foundation Program Specialist – 2/1/22

- Kokua Hawai‘i Foundation:
    - Kokua Hawai‘i Foundation is a nonprofit established in 2003 by Jack and Kim Johnson
    - It is an environmental education nonprofit with the mission to provide students and families in Hawai‘i with environmental education opportunities and to connect people more to their food
    - ‘Aina in Schools program → a farm to school initiative in 23 O‘ahu schools
    - Train educators across the islands on to implement curriculum to provide more agricultural literacy
    - Grant program provides students or teachers with money to do an environmental type project
    - Plastic Free Hawai‘i

        - Promotes plastic free initiatives including beach cleanups and reusables
    - Farm to School Hui - a group of folks from all of the islands that come together and talk about ‘farm to school’ initiatives as well as pushing legislation through and policy changes
- Farm to School Efforts:
    - ‘Farm to school’ is really hard in Hawai‘i for a lot of political reasons
    - There is some legislation that is going through to hire a dedicated ‘farm to school’ manager for the state.
    - Otherwise there are not many pushes to get local seafood in schools
    - Served shrimp as part on one of their ‘Aina Pono meals but not much otherwise
- Chef Hui initiative
    - Sustainable seafood initiative where they focus on the invasive ta’ape fish
    - Bridge farmers and ranches and producers with chefs who are feeing the community
    - Trying to popularize and create a market for ta’ape
    - Worked with a couple chefs and fishermen who are catching and cooking the ta’ape
    - Educational materials for children like coloring pages and short videos explaining the project
- Obstacles in ‘sea to school’
    - More wealthy private schools are more easily able to source local food and also to have the budget to afford equipment and staff to prepare and cook food
    - Public schools do not always have kitchens or staff that have the skills and willingness to cook from scratch
    - Subsidized lunches → it is hard when it is a unified school district to invest in like one school and not the other schools that have more kids receiving free lunch
    - For a lot of local farmers, the bureaucracy that they have to go through sometimes to work with the DOE is not worth the contract that would come out of it
        - This would require some policy changes as well as a greater investment in local fishing

    - Some farms and fisheries may not be able to keep up with the demand of a DOE contract
- Educational Curriculum
    - ‘Aina in Schools educational programming is free to all schools (accessible to less wealthy public schools)
    - Easier for the curriculum to get into the schools because they are offering services for free
    - Got parents involved with the educational programming by taking parent volunteers to go into classes to teach the lessons
    - Because of Hawaii’s history of plantation work there is a bit of a stigma surrounding choosing agriculture as a career
        - As such, it is important that students are receiving education about agriculture, and the food system, and where their food is coming from to strengthen their relationship with food and sustainability

Kevin Chang - KUA Hawai‘i Executive Director - 2/3/22

- KUA - created as a mechanism grassroots native Hawaiian community efforts
    - Community based stewardship
- KUA - Kua‘āina Ulu ‘Auamo
    - Kua‘āina refers to those keeping the Hawaiian culture alive
    - Ulu means to grow
    - ‘Auamo is the carrying stick used to hold a heavy burden on ones shoulders
- Less than 1% of the state budget is dedicated to care for the environment
- HUI MĀLAMA LOKO I’A - community building and education to restore indigenous aquaculture sites, and reinvigorate community culture values
- Restorative aquaculture - reach productivity level to become hatcheries/nurseries, move fish from ponds to near shore to replenish populations
- 400 to 600 fishponds throughout the state
    - Bigger ones on the shore line and composed of Kola rock formations with sluice gates for fish
    - Mullet and thread fish are primary focus
- In 1903, there was 800,000 ponds of fish landed

    - Today, it's down to 4,000 pounds
- People all over have learned techniques about aquaculture and fishponds from Hawai'i and have made an industry
- Education efforts based on the work their community is doing
- Pilot hatchery projects is the current stage

Herb Lee - Pacific American Foundation President and CEO - 2/4/22

- Curriculum - trained over 6,000 teachers, kids being brought to ponds on the islands
- Stewardship, awareness, education
- Initiative for conversion of public schools to community schools
    - Community resources to help learning
- Culture based education
- Currently, fishponds are living, functional, cultural resources
    - Fish, predators, and invasive species in them
    - Water quality is all over the place
- Trying to determine variables of what needs to be accounted for in order to be productive again (Hawaiian fishpond is on the verge of vanishing)
- 488 ponds since 800 years ago, less than 10 or 15 percent of them left
- Water quality does not meet standards for supplying fish to schools currently
    - Growing fish in tanks, next to pond, water from the pond, filtering it, running it through tanks, and back to pond
- Maximum productivity - 2,000 pounds per acre
- Currently farming Mullet
    - Also, Nenue
    - Native Oysters vs. Pacific Oysters
    - Sea cucumbers
- Believes tilapia would be the fastest, easiest way to get fish into food diets

Mark Noguchi - Punahou School Food and Sustainability Curriculum Specialist - 2/15/2022

- Works with teachers in subjects like social studies or language to discover what the kids are learning about and then creates an activity around food
- Sources ingredients growing on campus, or from local farmers

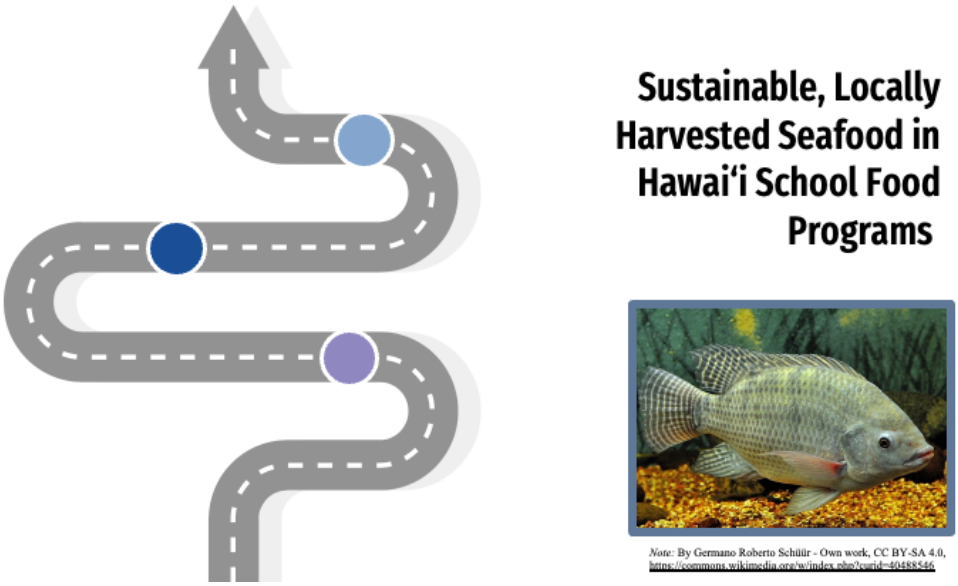
    - May encourage families to also source local foods
- Cooking heritage - asks students a dish they grew up with or remember well, learn all about it, and cook it
    - The meal is served to one of the school's departments, like facilities, maintenance, etc.
- Punahou is a private school, but like any school, large changes do not happen instantly
    - Cafeteria has a system that it has had for many years
    - Not an easy change
- Uses local fish for chemistry, process of denaturing proteins
- Serving fish, goes back to the skill level of kitchen staff. Do they know how to cook different kinds?
- A lot more leeway with private schools
- Major challenge is cafeteria workers, and getting cafeteria workers
    - Restrictions they have
    - Greatest challenge is fear

Appendix H: Outreach presentation and video

Slide 1: Introduction Slide

Hello everyone and welcome. In this informational video guide, we will be discussing the prospects of increasing sustainable locally produced seafood consumption in Hawai‘i school lunch programs through the design and implementation of a ‘sea to school’ lunch program. In this discussion we will explain the rationale for such a program and the purpose that it will serve to Hawaii’s population. Then we will propose the next steps that should be taken to continue making progress on this initiative and facilitate the successful design and implementation of the program.

Figure 7: Outreach Presentation Slide 1

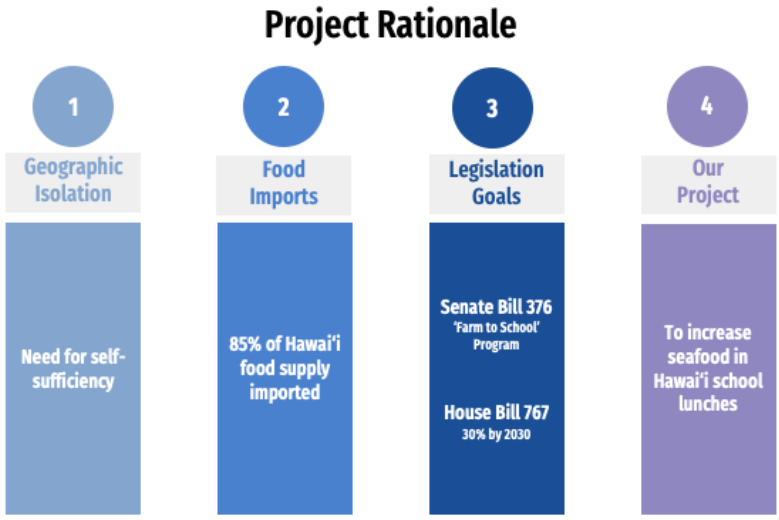


Slide 2: Rationale for project

The design and implementation of sustainable locally sourced food programs in schools are just one of the many strategies that are being utilized by the state of Hawai‘i to promote state-wide self-sufficiency and mitigate the threat of food insecurity imposed by Hawaii’s current food procurement system. This system has resulted from Hawaii’s complex agricultural history which combined with Hawaii’s geographic isolation and restrictive land use laws has put the agrofood sector of Hawaii’s economy in a state of decline. This has ultimately resulted in an economic framework that does not support local production for local consumption. As a result, approximately 85% of Hawaii’s food supply is currently imported from offshore distributors on

the United States Mainland or other foreign countries. The systemic shipping, processing, and storing of imported food has significantly increased the cost of food in Hawai‘i which has made high-quality food less accessible to lower-income families (especially those with children) and leaves the state’s food supply vulnerable to supply chain disruptions. These concerns have prompted the creation of many of Hawaii’s self-sufficiency strategy designs including the establishment of Hawaii’s ‘Farm to School’ program. In 2015, Senate Bill 376 was passed which established and allocated funds for a Hawai‘i ‘Farm to school’ program as well as a ‘farm to school coordinator to oversee its operations. This program was bolstered in 2021 by the passing of House Bill 767 which defined the programmatic goal of increasing the amount of locally sourced food in these programs to 30% by the year 2030.

Figure 8: Outreach Presentation Slide 2

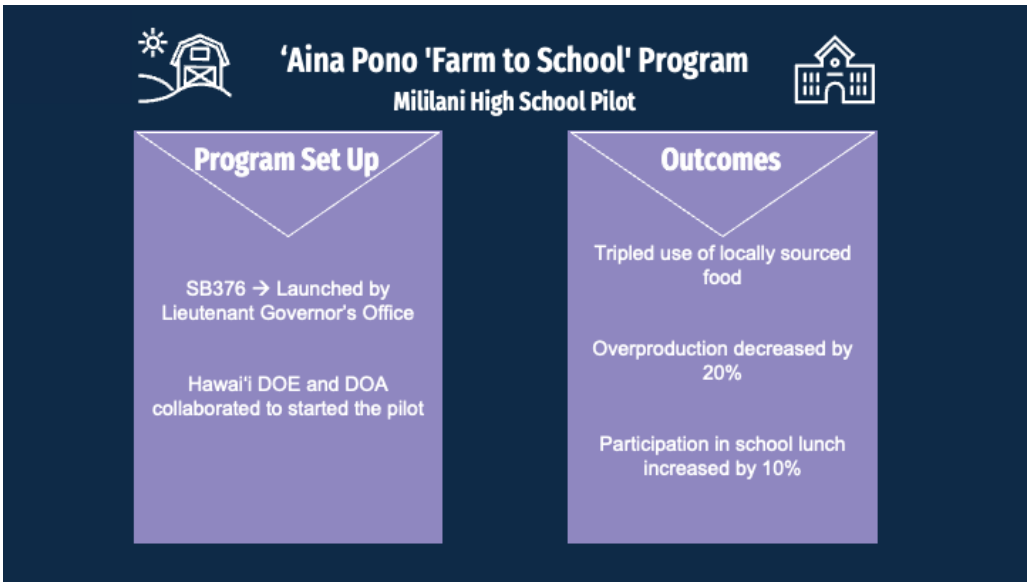


Slide 3: ‘Aina Pono Program

The ‘farm to school’ initiative was taken over by the Lieutenant governor’s Office after the passing of Senate Bill 376 and House Bill 767. This program was eventually renamed the ‘Aina Pono ‘Farm to School’ program in 2015. As a proof-of-concept test, the Lieutenant Governor's Office worked in collaboration with the Hawai‘i Department of Education and Department of Agriculture to start the pilot ‘Aina Pono ‘Farm to School’ program at Mililani High School in O‘ahu. Since its initial implementation, this pilot program has made significant progress towards the ‘30% local by 2030’ goal defined in House Bill 767 and succeeded in tripling the use of locally sourced food in the Mililani High School cafeteria. While this program

has been very successful at increasing the volume of fresh locally grown produce in school lunches, there have been no attempts to date to adapt them to utilize Hawaii's local seafood production as a resource for school food supplies. As such, the overarching goal of this project is to propose strategies that can be used to work under the framework modeled by the 'Aina Pono program to encourage schools in Hawai'i to purchase locally produced seafood for their school food programs. In the next few slides, we will outline these strategies.

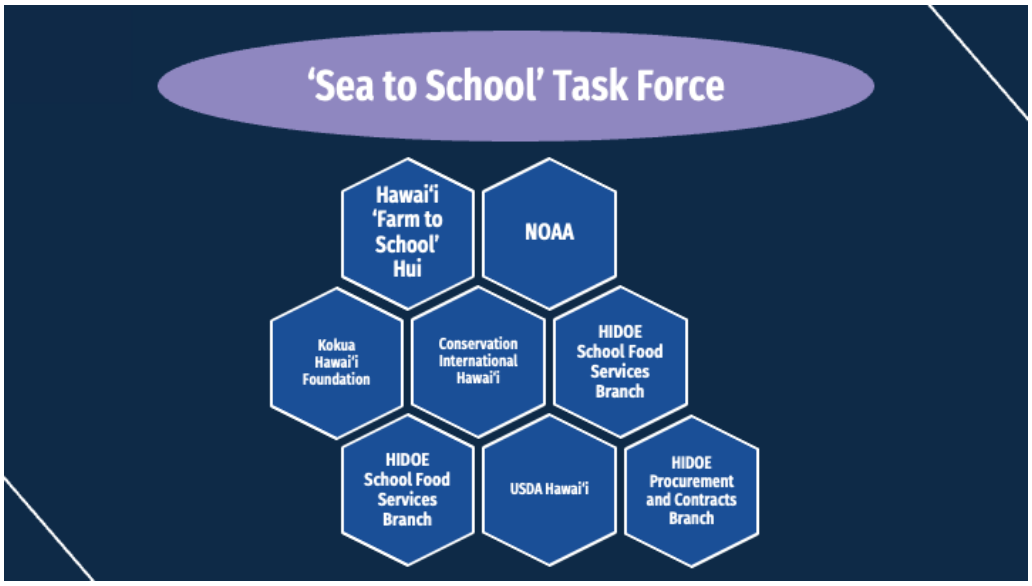
Figure 9: Outreach Presentation Slide 3



Slide 4: 'Sea to School' Task Force

Our first formal recommendation for the future of this project is to establish a dedicated 'sea to school' task force that will oversee the design and implementation of a 'sea to school' lunch program in the Hawai'i school district. On this slide we have included a few ideas for organizations that could be interested in membership on the task force and those that we believe could provide valuable resources or knowledge to a 'sea to school' design initiative. The purpose of this task force would be to establish a formal platform for collaboration among these different organizations to compile resources, ideas, and connections while working towards the common goal of designing and implementing a 'sea to school' program for the Hawai'i school district.

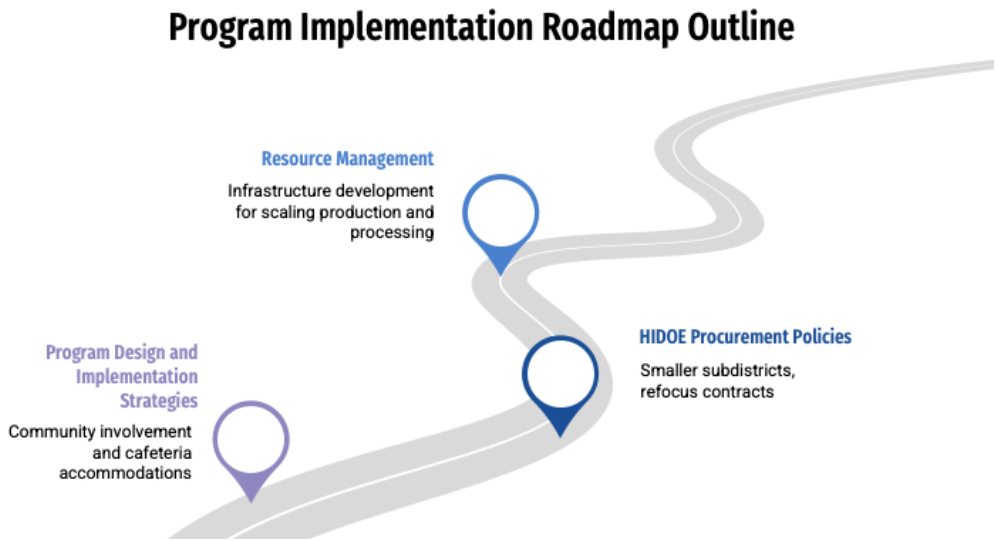
Figure 10: Outreach Presentation Slide 4



Slide 5: Program Implementation Roadmap Outline

To help the task force get started on this project, we have compiled a series of smaller project recommendations for the team that we have outlined in the following few slides. These projects have been separated into three separate categories: Program Design and Implementation Strategies, Hawai‘i Department of Education Procurement Policy changes, and resource management.

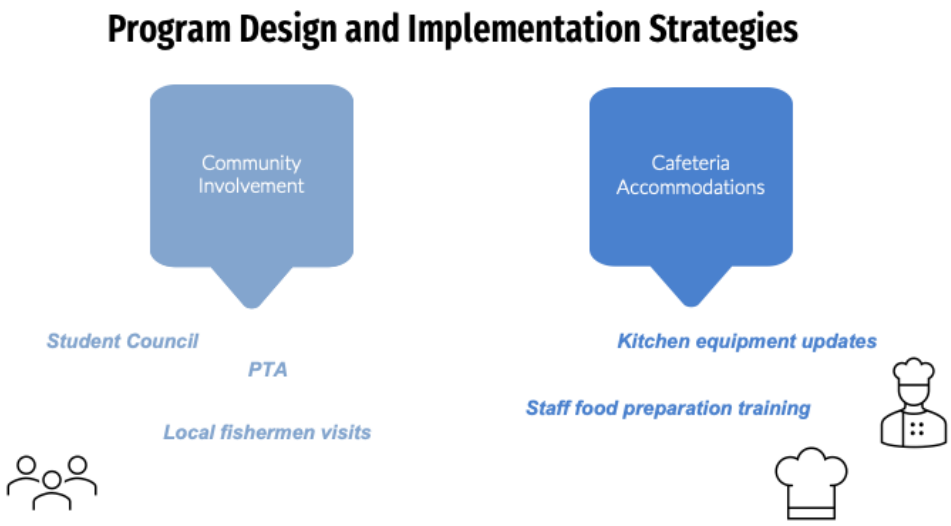
Figure 11: Outreach Presentation Slide 5



Slide 6: Program Design and Implementation Strategies

One of the main responsibilities of the 'sea to school' task force would be to oversee the design of the programs and facilitate their implementation into the Hawai'i school district. To make this transition as smooth as possible and mitigate potential resistance from students or staff, we have two recommendations for this process. First, we suggest involving the students and staff in the school community as much as possible in the design process of the program. This could include getting students involved in marketing the project or having staff help to design the menu or creating complementary educational programming for students or any other way to promote positive engagement with the program. Our second suggestion is to work with cafeteria staff to understand their level of skill in the kitchen and the equipment limitations in school cafeterias that would need to be addressed in order for schools to adjust to scratch cooking with fresh ingredients and then work to accommodate those needs when designing the program. These efforts could include upgrading kitchen facilities and providing skill training seminars for the cafeteria staff.

Figure 12: Outreach Presentation Slide 6

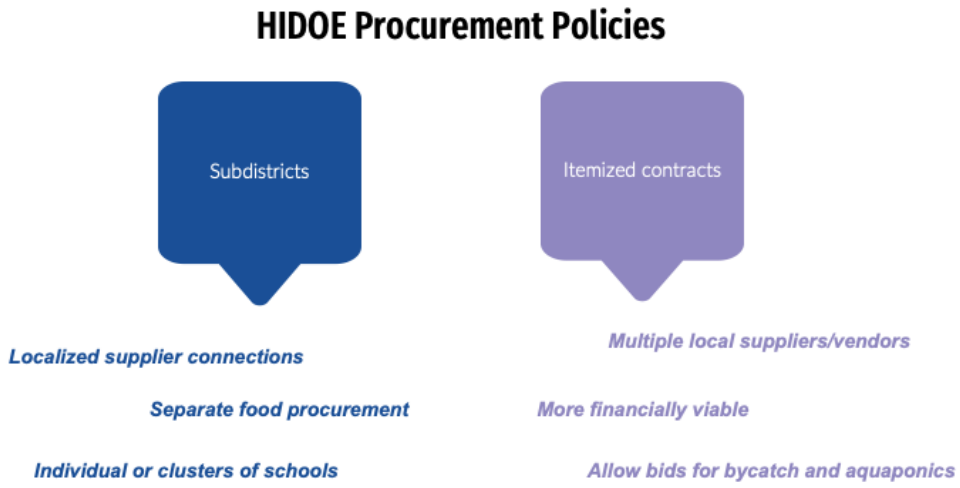


Slide 7: Hawai'i Department of Education Requirements

Another project that we recommend that the 'sea to school' task force prioritizes is taking steps in collaboration with the Hawai'i Department of Education to decentralize the Department procurement operations and refocus the associated procurement policies to accommodate multiple smaller contracts with local food suppliers. Today, most of the supplier contracts with

the Hawai‘i Department of Education cover food supplies for the entirety of the Hawai‘i school district. The volume of food that is required of these distribution companies is so great that it is difficult for local producers to compete with the large-scale offshore distributors for contracts with the Department of Education under the current system. Therefore, we propose subdividing the Hawai‘i school district into smaller sub-districts each with their own procurement operations and policies. This would make business with local suppliers more financially and logistically viable. Our second recommendation is to refocus contracts to be made for each individual food item that is required rather than an ‘all or nothing’ approach. These adjustments would make local food procurement more logistically and financially viable.

Figure 13: Outreach Presentation Slide 7

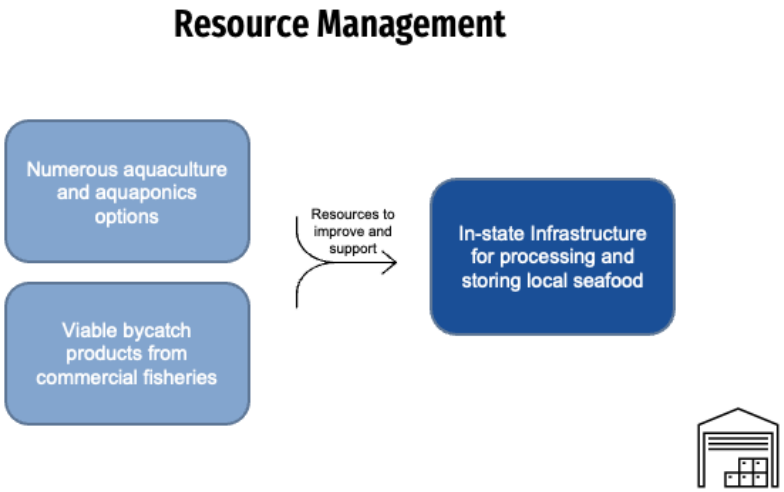


Slide 8: Resource Management

The design and eventual implementation of a ‘sea to school’ lunch program in the Hawai‘i school district will require careful management of time, money, and resources. We have a few suggestions for the ‘sea to school’ task force for ways to prioritize the use of program resources to most effectively support programmatic goals. The first of our suggestions is to work to leverage support and funds to promote further development of in-state seafood processing and storage facilities. We also suggest investing in alternative seafood products that result from commercial wild-caught bycatch and seafood being produced in aquaponics or aquaculture

systems. It is likely that these products will be the most financially and logistically viable for a ‘sea to school’ lunch program in the Hawai‘i school district.

Figure 14: Outreach Presentation Slide 8



Slide 9: ‘Sea to School’ Program Support

We appreciate the complexity of designing and implementing a school food program that prioritizes sustainable, locally sourced food and we acknowledge that this project will require time and resources. It will take time and patience to work around the factors limiting progress on this project including the Hawai‘i Department of Education policies, lack of sufficient seafood processing infrastructure, and underequipped kitchen facilities. In this presentation we have made only a few recommendations for the future of this initiative and the steps that can be taken to get there. For more information on this topic, please refer to our paper titled ‘Sustainable, Locally Harvested Seafood in Hawai‘i School Food Programs’ which can be found on the digital.wpi.edu website. Thank you.

Figure 15: Outreach Presentation Slide 9