

National Fish and Wildlife Foundation
Fisheries Innovation Fund - 2016 - Submit Final Programmatic Report (New Metrics)
Grantee Organization: Ecotrust
Project Title: Enhance the Capacity of Fishing Businesses and Communities through Expanded Market Opportunities for Fresh Frozen Seafood (AK, CA, OR)

Project Period 7/01/2016 - 8/30/2017

Project Location Sitka, Alaska; Port Orford, Oregon; Portland, Oregon; and Monterey, California

Description

(from Proposal)

Project

Address market barriers to fresh frozen fish using an innovative tool that measures seafood freshness.

Summary (from

Project will partner with fishing communities from Alaska to California to increase consumer

Proposal)

understanding in supply chain transparency, underutilized species, and seafood freshness and quality.

Project Status

and

Accomplishments

With the National Fish and Wildlife Foundation's support and that of our partners, Ecotrust completed a study that compares the freshness, quality, and consumer acceptance of fresh, never-frozen and flash-frozen fish. To conduct the study, we purchased fresh, never-frozen Black Cod and Coho Salmon from high-end local grocers, and sourced flash-frozen fish of the same varieties from small scale, community-based fishing businesses. Fish freshness and quality of both types was tested using a Seafood Certified Quality Reader device. Consumer acceptance and preference was also tested, through Oregon State University's Food Innovation Center, located in Portland, OR. When compared to the fresh, never-frozen fish, our study found that the flash-frozen fish registered as a higher quality or "fresher" product and had a higher overall liking by consumers. To raise awareness and more effectively communicate the benefits and quality of flash-frozen fish, Ecotrust and our partners developed outreach products including: an executive summary, a postcard, two recipe cards, a presentation slide deck, an op-ed, and a communications tool kit.

Outcome 1

- In August 2016, Ecotrust collaborated with partners to source line-caught, flash-frozen Black Cod and Coho Salmon.
- Necessary trainings were taken to learn about the functionality of the Seafood-CQR device which instantly determines freshness and quality.
- The device was used to take measurements of the fish.

Outcome 2

- The Seafood-CQR device assigns a Certified Quality Number (CQN) or "freshness" score to each fish which ranges from a high score of 100 (just harvested) to less than 10 (several weeks old). In general, a higher CQN correlates to a fresher, higher-quality fish.
- Test results of the flash-frozen fish registered CQN of 80 for Black Cod, and 79 for Coho Salmon. Comparatively, fresh, never-frozen fish of the same species came in significantly lower with an average CQN of 15 for Black Cod and 20 for Coho Salmon. Based on the quality scale developed by Seafood Analytics, the fresh, never-frozen fish was projected to be two weeks old.
- As part of their online platform, Seafood Analytics has generated graphics, scales and tables based on the data gathered by the CQR devices during this study and others. From an online dashboard, users can find their data and create graphics to use in marketing materials.

Outcome 3

- Seafood Analytics shipped devices to three local ports and produced and provided links to three instructional videos.
- Three employees from each port received additional training and instructions on how to properly use the device by phone and email.
- Two additional processor workers and two fishermen were trained in the use of the device.

Outcome 4

- In September 2016, Ecotrust helped to coordinate the shipment of the flash-frozen fish and the purchase and transportation of fresh, never-frozen fish to OSU's FIC.
- FIC chefs and technicians administered two days of blind consumer sensory-testing that compared line-caught, flash-frozen Black Cod and Coho Salmon to fresh, never-frozen fish of the same species.
- OSU's FIC recruited over 100 consumers to participate in the testing.

- Acceptability testing addressed a range of factors including appearance, aroma, flavor, texture, quality, overall liking, and purchase intent.
- Across all categories, flash-frozen fish was rated as either more appealing or statistically the same as fresh fish. Looking specifically at Black Cod, consumers preferred flash-frozen samples in every category except appearance, in which there was no statistical difference.

Outcome 5

- Seafood Analytics and OSU's FIC each prepared a report outlining the major findings from their tests.
- These reports were referred to in the creation of an internal Ecotrust report which served as a foundation for Ecotrust's Communications team and project partners to develop marketing materials and messaging for flash-frozen seafood products.
- Results of the study have been shared widely and continue to be circulated by participating partners through their newsletters, blogs, and social media.
- Additionally, project partners have spurred local papers and web-based papers to write their own articles.
- Blogs, reports, and outreach materials have been shared with Fish Choice, Fish Locally Collaborative, Local Catch, Alaska Seafood Marketing Institute and others.
- Project partners have delivered outreach materials and/or conducted formal presentations at 6 events, conferences or schools.

Outcome 6

- To build and strengthen relationships with customers, Ecotrust's design team created two "Chef's Recipe Cards" for Coho Salmon and Black Cod, in collaboration with Executive Chefs Matthew Beaudin of the Monterey Bay Aquarium and Lionel Uddipa of the restaurant SALT.
- Both chefs have great credibility in seafood societal circles.
- An op-ed has been developed with Nell Newman.

Lessons Learned

The importance of consumer-level testing, research, and engagement should not be underestimated. Through our outreach, it's clear that consumers and industry partners are surprised and intrigued by our findings. Consumers unacquainted with flash-frozen are interested and curious that a frozen product could outperform a fresh product and be deemed more acceptable. Generally, many of the consumers who are aware of the benefits of flash-frozen are interested in trying it. Meanwhile, those aware of and at least somewhat familiar with a frozen product seem to feel more reaffirmed in their choice to purchase frozen. Anecdotally, the seafood industry seems unsurprised by the results, but shows much interest in the Seafood-CQR device and its potential impact.

Long-term use and utility of the Seafood-CQR device for smaller community-based fishing business still needs to be determined. For community-based fishing businesses involved in processing and distribution, the device appears to be somewhat dependent upon business operations. Those that are working with a large fleet of boats and array of products, have a large employee pool, and have technical capacity, may find the device to be a good fit. However, it may not fit as well into the models and operations of smaller businesses. With fewer boats, generally the business operator knows the quality of the product they will be receiving, so they don't have a high need for such a device. If a business has less staff, it may be difficult to justify spending the time and resources to get data on quality. The Seafood-CQR device is a fairly easy product to learn, but it does require time, resources and a mid-level technical competency. Alaskan's Own, a small community-based fishing business, is currently exploring ways to expand the use of the device and better integrate CQR testing into their marketing strategy. Their future success or struggles with incorporating the device will provide great insight and indicators for usability of the device at this scale.

The Seafood-CQR device's ability to upload data immediately to a cloud-based data storage system and to accurately record data from a wide array of fish species is truly impressive. Having data and proof of quality could be a game changer for businesses who are acquiring product from multiple boats. If it is determined that using the certified quality label is something that increases consumer purchasing, this will likely make the device more attractive to businesses.

As the device is upgraded, it could be a perfect tool to be used elsewhere in the seafood chain. For example, the Food and Drug Administration could use the device to streamline and expand its inspections. Additional markets for the device could include second-hand distributors and be at the buyer level. The utility of the device at these points in the food chain is yet to be evaluated, however

these potential uses are worth noting and further exploration.

Finally, the Seafood CQR device currently cannot read and certify a thawed, previously frozen product. On the seafood buyer side, this has been somewhat of a sticking point. The buyer of a frozen product cannot use the device to demonstrate quality. Buyers simply need to believe in the quality of the product they are purchasing. Although, if a frozen product carries the Seafood-CQR label that demonstrates the quality of the fish before it was frozen, that may have meaning. It could be fascinating to see how the certified quality label changes or enhances purchasing intent.

As a result of some Ecotrust staffing changes over the course of this project, we learned the importance of keeping existing documents, important contact information, and related background materials available and easy to locate. Two employees who began and managed this work moved to other organizations early in the project implementation. It took a considerable amount of energy and time to appropriately onboard a new hire, have them become familiar with the project, and get acquainted with our partners. If this transition had not been as well coordinated, project timelines and deliverables could have been delayed much further.

Lessons were also learned regarding the complexities of developing relationships for publications of public facing materials and the value of personal connections. Through this project, we were determined to reach established or upcoming individuals with credibility in seafood and food societal circles. As such, much time and energy was invested in seeking and developing relationships with chefs and other established individuals. While we struggled to retain the support and interest of cold contacts that we didn't have prior relationships with, each of the individuals currently supporting our project outreach materials were secured through our partners. These connections through our partners is where we've been most successful.

Activities and Outcomes

Funding Strategy: Planning, Research, Monitoring

Metric: FIF - Tool development for decision-making - # tools developed

Required: Recommended

Description: Examples: risk pools, modified/improved fishing gear, improved fishing practices, voluntary avoidance methods, electronic monitoring devices (cameras), software systems/applications, etc

Starting Value	0.00 # tools developed
Value To Date	1.00 # tools developed
Target value	1.00 # tools developed

Note: Seafood Analytics' Seafood-CQR device was used to certify the freshness and quality of fish immediately prior to flash freezing in three fishing communities. This work has been followed by the development of a seafood freshness and quality scale, and a labeling system for marketing and labeling all rated flash-frozen seafood products.

Funding Strategy: Capacity, Outreach, Incentives

Metric: FIF - Outreach/ Education/ Technical Assistance - # people reached

Required: Recommended

Description: For this metric, use the expected # of fishermen/stakeholders in attendance at informational meetings, workshops, or events

Starting Value	0.00 # people reached
Value To Date	133941.00 # people reached
Target value	306800.00 # people reached

Note: - POSS newsletter reached over 300 subscribers;
- RGF newsletter reached an estimated 1,500 subscribers;
- ALFA newsletter reached an estimated 576 subscribers;
- ALFA blog reached an estimated 460 people;
- ALFA social media reached 441 people;
- Ecotrust newsletter reached an estimated 7,960 subscribers;
- Ecotrust blog reached 1,185 people;
- Ecotrust social media reached 6,577 people;
- The Community Fisheries Newsletter reaches 86 people;
- Seafood distribution channels reached an estimated 20,000 people;
- Seafood festivals, events, and conferences reached an estimated 23,660 people;
- Outreach to a California cooking school and a graduate class reached 50 students;
- local and national online newspapers articles published reached an estimated 71,146 people;

In addition to the above people already reached, we expect to meet or exceed our target value through additional publications and outreach events, including:

- One national op-ed estimated to reach at least 200,000 (developed, but not yet published);
- One regional op-ed (Alaska) estimated to reach 20,000
- One conference presentation and two additional events estimated to reach at least 1,500 by November 30, 2017;
- Seafood distribution channels estimated to reach 60,000 (narrative and materials sent, but not yet published).

Funding Strategy: Capacity, Outreach, Incentives

Metric: FIF - Building institutional capacity - # FTE with sufficient training

Required: Recommended

Description: The number of additional staff expected to be hired to participate in/manage the project, if any

Starting Value	0.00 # FTE with sufficient training
Value To Date	13.00 # FTE with sufficient training
Target value	6.00 # FTE with sufficient training

Note: Three employees from each community supported fishery focused business (Alaska, Oregon, California) were trained in the use of the Seafood-CQR device. At Stika Sound Seafoods, Alaskan's Own Staff trained two additional processor workers and two fishermen in the use of the Seafood-CQR device.



NFWF

Final Programmatic Report Narrative

1. Summary of Accomplishments

In four to five sentences, provide a brief summary of the project's key accomplishments and outcomes that were observed or measured. This can be duplicative to the summary provided in the reporting 'field' or you can provide more detail here.

With the National Fish and Wildlife Foundation's support and that of our partners, Ecotrust completed a study that compares the freshness, quality, and consumer acceptance of fresh, never-frozen and flash-frozen fish. To conduct the study, we purchased fresh, never-frozen Black Cod and Coho Salmon from high-end local grocers, and sourced flash-frozen fish of the same varieties from small scale, community-based fishing businesses. Fish freshness and quality of both types was tested using a Seafood Certified Quality Reader device. Consumer acceptance and preference was also tested, through Oregon State University's Food Innovation Center, located in Portland, OR. When compared to the fresh, never-frozen fish, our study found that the flash-frozen fish registered as a higher quality or "fresher" product and had a higher overall liking by consumers. To raise awareness and more effectively communicate the benefits and quality of flash-frozen fish, Ecotrust and our partners developed outreach products including: an executive summary, a postcard, two recipe cards, a presentation slide deck, an op-ed, and a communications tool kit.

2. Project Activities & Outcomes

Need

When it comes to seafood, the question of whether a fish is frozen or fresh matters in more ways than one. Fresh fish is wonderful and healthful, but few consumers realize that carefully handled flash-frozen fish is of equal - if not superior - quality. Flash-freezing locks in freshness and quality the day a fish is caught and processed, whereas fresh fish may sit in grocery display cases for eight days or more. Freezing also allows small-scale fishermen to participate in and develop markets for underutilized species, thereby increasing resource utilization without increasing fishing intensity. Further, freezing allows for buffering against seasonal flooding of core markets. Flash-freezing has an opportunity to solve significant issues facing domestic small-scale fishermen, such as: seasonal swings in volume, distribution cost, and supply and demand, thereby generating much less waste.

Despite the many benefits and opportunities flash-freezing offers, many consumers perceive frozen seafood to be a cheaper, lower-quality product. This creates a market barrier for small-scale commercial fishermen with lower volume fisheries who need to meet a higher price margin to remain viable. With the current marketplace flooded with cheap imports of questionable origins, unknown workers and fishing conditions, and environmental impacts, U.S. fishermen need a market differentiator that communicates the values consumers desire most: quality and freshness. Our study aimed to form a base of research and develop education and outreach materials, to change consumer perceptions that frozen seafood is of lesser quality, thereby helping to remove a market barrier for small-scale commercial fishermen and encourage consumption of more carbon-friendly seafood.

Activities

Describe the primary activities conducted during this grant and explain any discrepancies between the activities conducted from those that were proposed.

- 1. Seafood Quality Certification: The Seafood-CQR device will be used in each of the three fishing communities to test and certify the quality of both fresh (never-frozen) Black Cod and Coho Salmon, as well as the same species, immediately prior to flash-freezing.**
 - a. Keith Cox, Senior Scientist with Seafood Analytics, will provide video-based training to three project partners for the use of the Seafood Certified Quality Reader (CQR) device: Port Orford Sustainable Seafood (POSS), Real Good Fish, and Alaskan Longline Fishermen's Association / Alaskans Own (ALFA).
✓ Complete
 - b. Keith Cox will send the Seafood-CQR device to the three project partners.
✓ Complete
 - c. Project partners will work with Keith Cox and Seafood Analytics to develop a seafood freshness and quality scale complete with a labeling system for marketing and labeling all rated flash-frozen seafood products.
✓ Complete
 - d. The three fishing communities (Alaskans Own in Sitka; POSS in Port Orford, OR; and Real Good Fish in Monterey, CA) will coordinate the shipment of approximately 350 oz. of never-frozen Black Cod, and 350 oz. of never-frozen Coho Salmon, and collaborate to ship a total of approximately 350 oz. of flash-frozen Black Cod, and 350 oz. of flash-frozen Coho Salmon to Oregon State University's Food Innovation Center (OSU's FIC) to prepare for the blind consumer taste test.
✓ Complete - We used 400 oz. of fish to allow for more consumers to partake in the testing. Also, we purchased the fresh, never-frozen fish from high-end Portland, OR grocery stores and drove it to the testing location, to reflect what local customers would typically purchase.

- 2. OSU FIC Blind Consumer Taste Test: Difference testing and preference/acceptability testing of the flash-frozen vs. fresh Black Cod and Coho Salmon will be explored as well as the larger study of understanding consumer attitudes about Black Cod and Coho Salmon, specifically, and fish in general.**
 - a. Consumer recruitment will be implemented by Kirsten Allen, Sensory Technician at the FIC.
✓ Complete
 - b. Sensory test administration and execution will be conducted by the Sensory Program Manager, Research Chef, Sensory Technician, two kitchen assistants, and a receptionist.
✓ Complete
 - c. PowerPoint report generated on the results of the test.
✓ Complete

- 3. Public Education Conducted to Raise Consumer Awareness: Using the results from both the seafood quality certifications and the blind consumer taste test, develop and launch public education materials to raise awareness about the high quality and value of carefully handled flash-frozen seafood.**

- a. Results of study will be compiled into a report that outlines the benefits of small-scale fishing, the certified quality of carefully handled flash-frozen fish, and data about consumer acceptance of frozen seafood and of certain species.
 - ✓ Complete - Please see “A Fresh Look at Frozen Fish, Expanding Market Opportunities for Community Fishermen.” (uploaded)
- b. Identify 1-2 chefs with public credibility to 1) create easy recipes for flash-frozen fish, and 2) work with Ecotrust communications staff to discuss their positive experience in working with flash-frozen fish together with comments on the report in at least 2 op-eds or editorials placed in Alaska, Oregon, or California papers.
 - ✓ 1) Complete & 2) Partially Complete - We are working on an op-ed with Nell Newman, the co-founder of Newman’s Own Organics, and the President of the Nell Newman Foundation. The op-ed (uploaded) is currently under review and will be submitted to the Huffington Post.
- c. Port Orford Sustainable Seafood Newsletter will carry the story to members, along with sharing via POSS social media outlets and website.
 - ✓ Complete - The story is not posted on their website, as they removed their site’s blog and now interact with members through newsletters.
- d. Real Good Fish Blog will carry the story to members along with RGF’s social media outlets and website.
 - ✓ Complete
- e. Alaska Longline Fishermen’s Association’s Newsletter will carry the story to members along with posting on ALFA’s website.
 - ✓ Complete
- f. Ecotrust will carry the story to followers via its newsletter and via Ecotrust’s social media outlets and blog.
 - ✓ Complete
- g. The Community Fisheries Network will carry the story to members via its newsletter, blog, and social media outlets.
 - ✓ Complete
- h. An electronic version of the report will be shared through seafood distribution channels, including outreach to Slow Food, Alaska Seafood Marketing Institute, and the Chef’s Collaborative.
 - ✓ Complete - The report has been given to Slow Food and the Chef’s Collaborative, however they have not shared the information yet.
- i. Release printed executive summaries of the report at seafood events and festivals, including the Sitka Seafood Festival in August 2017; the Portland Seafood & Wine Festival in February 2017; the Pleasure Point Street Fair near Santa Cruz, CA, in June 2017; and the 4th of July Festival in Port Orford.
 - ✓ Complete - Due to scheduling conflicts and prioritizing other presentation opportunities, booths and presentations were not delivered at the 2017 Portland Seafood & Wine Festival; the 2017 Pleasure Point Street Fair near Santa Cruz, CA,; or the 4th of July Festival in Port Orford.
- j. Real Good Fish will do presentations using both the Seafood CQR device and the final report with 1 cooking school and 1 graduate school class near Monterey, CA.
 - ✓ Complete

Outcomes

- *Describe progress towards achieving the project outcomes as proposed. and briefly explain any discrepancies between your results compared to what was anticipated.*
- *Provide any further information (such as unexpected outcomes) important for understanding project activities and outcome results.*

1. Freshness and quality certification of two species of flash-frozen fish from three fishing communities in Alaska, Oregon, and California by piloting new electronic technology.

- In August 2016, Ecotrust collaborated with partners to source line-caught, flash-frozen Black Cod from Port Orford Sustainable Seafood, in Port Orford, OR and Coho Salmon from the Alaska Longline Fishermen's Association, in Sitka, AK.
- Necessary trainings were taken to learn about the functionality of the Seafood-CQR device. The device instantly determines freshness and quality by sending a low frequency electrical current through a whole fish or fillet.
- The device was used to take measurements of the flash-frozen fish prior to freezing and the fresh, never-frozen fish after being purchased and just before consumer sensory testing commenced at the FIC.

2. Development of a seafood freshness and quality scale complete with a labeling system for marketing and labeling all rated flash-frozen seafood products.

- Once data has been gathered electronically, the Seafood-CQR device assigns a Certified Quality Number (CQN) or "freshness" score to each fish which ranges from a high score of 100 (just harvested) to less than 10 (several weeks old). In general, a higher CQN correlates to a fresher, higher-quality fish.
- Test results of the flash-frozen fish registered CQN of 80 for Black Cod, and 79 for Coho Salmon. Comparatively, fresh, never-frozen fish of the same species came in significantly lower with an average CQN of 15 for Black Cod and 20 for Coho Salmon. Based on the quality scale developed by Seafood Analytics, the fresh, never-frozen fish was projected to be two weeks old.
- As part of their online platform, Seafood Analytics has generated graphics, scales and tables based on the data gathered by the CQR devices during this study and others. From an online dashboard, users can find their data and create graphics to use in marketing materials.

3. At least 2 project team members trained to use the Seafood-CQR device at each of the 3 local ports (Sitka, AK; Port Orford, OR; and Monterey, CA) for a total of 6 people trained.

- Seafood Analytics shipped devices to these three local ports and produced and provided links to three instructional videos.
- Three employees from each port received additional training and instructions on how to properly use the device by phone and email.
- At Sitka Sound Seafoods, Alaskan's Own Staff trained two additional processor workers and two fishermen in the use of the Seafood-CQR device.

4. Completion of a blind taste test panel with 100 consumers at OSU's FIC.

- In September 2016, Ecotrust helped to coordinate the shipment of the flash-frozen fish and the purchase and transportation of fresh, never-frozen fish to OSU's FIC on the morning of the first day of testing.
- FIC chefs and technicians administered two days of blind consumer sensory-testing that compared line-caught, flash-frozen Black Cod and Coho Salmon to fresh, never-frozen fish of the same species. Both fresh and flash-frozen fish were prepared in the FIC's commercial kitchen, where study participants were asked to answer questions relating to the difference between each sample and overall acceptability.
- OSU's FIC recruited over 100 consumers: 38 participated in the difference testing, and 108 participated in acceptability testing.
- Acceptability testing addressed a range of factors including appearance, aroma, flavor, texture, quality, overall liking, and purchase intent.
- Across all categories, flash-frozen fish was rated as either more appealing or statistically the same as fresh fish. Looking specifically at Black Cod, consumers preferred flash-frozen samples in every category except appearance, in which there was no statistical difference.

5. Results of the study will be compiled into a report that outlines the benefits of small-scale hook and line fishing, the quality of carefully handled flash-frozen fish, and data about consumer acceptance of frozen seafood and of certain species.

- Seafood Analytics and OSU's FIC each prepared a report (uploaded) outlining the major findings from their respective tests.
- Reports submitted by Seafood Analytics and OSU's FIC were referred to in the creation of an internal Ecotrust report, which outlines the ecological and community benefits of small-scale fishing, the added-value of flash-frozen seafood, project results, and next steps. This report served as a foundation for Ecotrust's Communications team and project partners to develop marketing materials and messaging for flash-frozen seafood products.
- Results of the study have been shared widely and continue to be circulated by participating partners through their newsletters, blogs, and social media.
- Additionally, project partners have spurred local papers and web-based papers to write their own articles.
- Blogs, reports, and outreach materials have been shared with Fish Choice, Fish Locally Collaborative, Local Catch, Alaska Seafood Marketing Institute and others.
- Project partners have delivered outreach materials and/or conducted formal presentations at 6 events, conferences or schools.

6. 1-2 chefs with public credibility will create recipes for flash-frozen fish and work with Ecotrust Communications staff to discuss their positive experience with flash-frozen seafood together with comments on this project's report in at least 2 op-eds or editorials placed in Alaska, Oregon, or California papers.

- To build and strengthen relationships with customers, Ecotrust’s design team created two “Chef’s Recipe Cards” for Coho Salmon and Black Cod, in collaboration with Executive Chefs Matthew Beaudin of the Monterey Bay Aquarium and Lionel Uddipa of the restaurant SALT.
- Both chefs have great credibility in seafood societal circles:
 - Chef Beaudin recently won a *Seafood Champion Award for “Vision”* at the 2017 Seaweb Seafood Summit for leading the shift to local and sustainable seafood in the Monterey Bay restaurant scene. Chef Beaudin transformed the product sourcing of the Monterey Bay Aquarium by shifting \$1 million in buying power to local producers and fishermen. Over 99 percent of the products used in his kitchen come from less than 90 miles away.
 - Chef Uddipa recently was crowned “2017 King Of American Seafood” at the 14th annual Great American Seafood Cook-Off, held in New Orleans. To earn the crown, Chef Uddipa and his Sous Chef Jacob Pickard prepared Sea Asparagus Risotto with Alaskan King Crab, beating out 12 of the nation’s best chefs by showing his creativity and craftsmanship in highlighting the superior quality of domestic seafood.
- An op-ed (previously described) has been developed with Nell Newman.

3. Lessons Learned

Describe the key lessons learned from this project, such as the least and most effective conservation practices or notable aspects of the project’s methods, monitoring, or results. How could other conservation organizations adapt similar strategies to build upon some of these key lessons about what worked best and what did not?

The importance of consumer-level testing, research, and engagement should not be underestimated. Through our outreach, it’s clear that consumers and industry partners are surprised and intrigued by our findings. Consumers unacquainted with flash-frozen are interested and curious that a frozen product could outperform a fresh product and be deemed more acceptable. Generally, many of the consumers who are aware of the benefits of flash-frozen are interested in trying it. Meanwhile, those aware of and at least somewhat familiar with a frozen product seem to feel more reaffirmed in their choice to purchase frozen. Anecdotally, the seafood industry seems unsurprised by the results, but shows much interest in the Seafood-CQR device and its potential impact.

Long-term use and utility of the Seafood-CQR device for smaller community-based fishing business still needs to be determined. For community-based fishing businesses involved in processing and distribution, the device appears to be somewhat dependent upon business operations. Those that are working with a large fleet of boats and array of products, have a large employee pool, and have technical capacity, may find the device to be a good fit. However, it may not fit as well into the models and operations of smaller businesses. With fewer boats, generally the business operator knows the quality of the product they will be receiving, so they don’t have a high need for such a device. If a business has less staff, it may be difficult to justify spending the time and resources to get data on quality. The Seafood-CQR device is a fairly easy product to learn, but it does require time, resources and a mid-level technical competency. Alaskan’s Own, a small community-based fishing business, is currently exploring ways to expand the use of the device and better integrate

CQR testing into their marketing strategy. Their future success or struggles with incorporating the device will provide great insight and indicators for usability of the device at this scale.

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Lessons were also learned regarding the complexities of developing relationships for publications of public facing materials and the value of personal connections. Through this project, we were determined to reach established or upcoming individuals with credibility in seafood and food societal circles. As such, much time and energy was invested in seeking and developing relationships with chefs and other established individuals. While we struggled to retain the support and interest of cold contacts that we didn't have prior relationships with, each of the individuals currently supporting our project outreach materials were secured through our partners. These connections through our partners is where we've been most successful.

4. Dissemination

Briefly identify any dissemination of project results and/or lessons learned to external audiences, such as the public or other conservation organizations. Specifically outline any management uptake and/or actions resulting from the project and describe the direct impacts of any capacity building activities.

Six outreach products were developed by Ecotrust and with project partner input to raise awareness with target audiences:

- An **executive summary** was developed that explains the reasoning and need for the project, discusses high level testing results, and the benefits of a high-quality flash-frozen product.
- Utilizing consumer acceptance testing results, a **6”x9” postcard** was created to advocate for flash-frozen products.
- The **two recipe cards** (previously described) and the postcard are being distributed by project partners at tradeshow, conferences, farmers’ markets, and other key points of contact to strengthen relationships with existing customers and build relationships with potential new customers for this project’s Community Supported Fisheries business partners.
- A well-designed **slide deck** was developed for all project partners to support presentations to audiences at conferences, schools, or other venues.
- A **communications tool kit** including photos and suggested narratives was developed to support all project partners with developing op-eds, blog posts, newsletter articles, and social media posting.
- Lastly, an **op-ed** (previously described) has been developed with Nell Newman.

Unexpected outcomes have begun to arise, as outreach materials have been reviewed by more interested individuals and project partners continue to connect with organizations and credible persons.

- Chef Uddipa and the Alaska Longline Fishermen’s Association are now working together to prepare for a few public events. They will be doing public cooking demonstrations while highlighting frozen product. More details are forthcoming as they continue to plan. This is a new connection between credible individuals and organizations that we hope to see grow.
- Chef Beaudin is now purchasing all of the Black Cod for his restaurant as flash-frozen and from a local fisherman.
- Real Good Fish has expanded the sales of frozen seafood during the life of this project. They are now selling over 150lbs of frozen seafood a month to individuals.
- Seafood Analytics will be working with OSU’s “Fish Trax” program and Real Good Fish to pilot a new endeavor. Fish Trax is an electronic fishery information platform that helps industry, marketers, and fishery managers collect, analyze, and share information that is critical for the success of their fishery seafood. Essentially it is a seafood traceability and marketing software system. Together they will pilot a data sharing and software integration project. Integrating data received by the Seafood-CQR device into the Fish Trax program will allow seafood businesses, such as producer-processors to use both Seafood Analytics’ device to track food quality across incoming product, while also using the Fish Trax program to provide traceability information. This would keep vital and very marketable information all in one place that can also be made available to the seafood buyer, whether they are another business, consumer at home, or sitting at a restaurant table.
- Recently, after seeing our outreach, Heidi Hanson of Warner Hanson Television contacted Ecotrust about an upcoming limited series show to be aired on PBS, called “Good Catch”. “Good Catch” is an educational cooking show that connects fishermen at sea while they bring in their catch with the chefs at the restaurants who cook it. Heidi has agreed that basing one of the episodes around a high-quality flash-frozen product and its benefits is a good idea and will be following up with us regarding the potential for a flash-frozen episode.

- Alaskan's Own (Alaska Longline Fisherman's Association) are currently in production of three shot videos that will feature value-added messages from the fish industry in Sitka, AK. One of the videos will focus on the high quality of Fresh Frozen seafood and draw on information from this study. In addition, as they prepare for next year, they intend to design an entire campaign, beyond the videos, around the flash-frozen study to continue to inform customers, seafood distributors and retailers.

5. Project Documents

Include in your final programmatic report, via the Uploads section of this task, the following:

- *2-10 representative photos from the project. Photos need to have a minimum resolution of 300 dpi. For each uploaded photo, provide a photo credit and brief description below;*
- *Report publications, Power Point (or other) presentations, GIS data, brochures, videos, outreach tools, press releases, media coverage;*
- *Any project deliverables per the terms of your grant agreement.*

On behalf of Ecotrust and our partners, thank you for the National Fish and Wildlife Foundation's support of this project to change consumer perceptions, remove a market barrier for small-scale commercial fishermen, and encourage consumption of more carbon-friendly seafood. We are pleased to share the following list of uploaded photos and materials which provide additional details about our project.

Uploaded Photos

- 1) Photo Credit: Alaska Longline Fishermen's Association. Conducting Seafood CQR Testing Before Flash-freezing. Sitka, AK (Only 98 DPI max available).
- 2) Photo Credit: Alaska Longline Fishermen's Association. Conducting Seafood CQR Testing Before Flash-freezing. Sitka, AK (Only 98 DPI max available).
- 3) Photo Credit: Alaska Longline Fishermen's Association. Conducting Seafood CQR Testing Before Flash-freezing. Sitka, AK (Only 98 DPI max available).
- 4) Photo Credit: Alaska Longline Fishermen's Association. Coho Salmon Test Batch, Catch at the Hoist Before Flash-freezing. Sitka, AK (Only 98 DPI max available).
- 5) Photo Credit: OSU, FIC. Consumer Sensory Testing Sept_2016. Portland, OR (Only 180 DPI max available).
- 6) Photo Credit: OSU, FIC. Consumer Sensory Testing Sept_2016. Portland, OR (Only 180 DPI, max available).
- 7) Photo Credit: OSU, FIC. Consumer Sensory Testing Sept_2016. Portland, OR (Only 180 DPI, max available).
- 8) Photo Credit: OSU, FIC. Samples Prepared for Consumer Sensory Testing Sept_2016 Portland, OR (Only 180 DPI, largest available).
- 9) Photo Credit: OSU, FIC. Preparing Samples for Consumer Sensory Testing Sept_2016 Portland, OR (Only 180 DPI, largest available).
- 10) Photo Credit: Real Good Fish. Presenting on Flash-frozen and Seafood-CQR with California Culinary Institute in Moss Landing, CA.

Uploaded Other Documents

- 11) Outreach Postcard
- 12) Chefs Recipe and Endorsement Cards
- 13) Project Executive Summary
- 14) Two Page Project Brief - Lightly Designed
- 15) Communications - Media Tool Kit

- 16) Flash-frozen Outreach Slide Deck
- 17) FIC Sensory Testing Report for Fresh vs Frozen Black Cod Coho Salmon
- 18) Seafood Analytics Report on Seafood CQR Test Results
- 19) A Fresh Look at Frozen Fish, Nell Newman Draft Op-ed
- 20) Alaska Longline Fishermen's Association Blog Post
- 21) A Fresh Look at Frozen Fish, Alaska Longline Fishermen's Association Newsletter
- 22) Port Orford Sustainable Seafood Newsletter
- 23) Article by Capital City Weekly.com - Southeast Alaska's Online Newspaper
- 24) Consumers Grade Frozen Fish Highly In OSU FIC Study, by FrozenFoodBiz
- 25) "The FishChoice Current", Newsletter by FishChoice_ Ecotrust Frozen Seafood
- 26) Seafood Analytics brings cutting-edge CQR device back to Boston, by Seafood Source
- 27) Seafood Analytics' CQR shifting industry to objective quality, by National Provisioner
- 28) Sustainable, high-quality seafood delivered to Southeast Alaska, by Juneau Empire - Alaska's Capital City Online Newspaper
- 29) Boston Seafood Expo Joint Presentation by Ann Colonna and Keith Cox. March, 2017
- 30) Ecotrust Blog - Flash Frozen Fish - A Tasty Opportunity for Community Fishermen
- 31) Ecotrust Newsletter - Fresh Frozen

POSTING OF FINAL REPORT: *This report and attached project documents may be shared by the Foundation and any Funding Source for the Project via their respective websites. In the event that the Recipient intends to claim that its final report or project documents contains material that does not have to be posted on such websites because it is protected from disclosure by statutory or regulatory provisions, the Recipient shall clearly mark all such potentially protected materials as "PROTECTED" and provide an explanation and complete citation to the statutory or regulatory source for such protection.*