



SkipperScience

2021 Pilot Program Results



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Introduction

Background/History

The Indigenous Sentinels Network (ISN) has been operating for over 20 years in the Bering Sea as an online database tool for non-scientists in remote locations to systematically record and share environmental and biological data in a standardized way. It fills a distinct niche that goes beyond opportunistic or incidental observations and instead focuses on systematic ecological monitoring under the guidance of scientifically rigorous protocols that can be implemented by non-scientists. The tool was designed to be flexible and expandable to accommodate the diverse needs of users and allows for multiple protocols and detailed data inputs. In recent years, its high credibility as a tribally-led data collection program has allowed the expansion of data collection efforts to several coastal communities in the Bering Sea. Its rigorous data standards have facilitated partnerships with federal agencies extending the scientific observation capacity to inform management decisions.

2021 SkipperScience Pilot Summary

During the 2021 summer commercial fishing season, partners from the Alaska commercial fishing industry collaboratively launched a pilot program called SkipperScience to test the viability of utilizing a structured citizen science framework that enables data and information collection by commercial fishing-specific users. The program employed existing smartphone and web technology to facilitate data collection and observations from the fishing grounds of Southeast Alaska and Bristol Bay, Alaska. Specifically the pilot program asked fishermen to document impacts of climate change in near real or real time. Sponsors of the program included:

- The Aleut Community of St. Paul Island Tribal Government
- The Aleutian Bering Sea Initiative
- Commercial Fishermen for Bristol Bay
- Alaska Fisheries Development Foundation, Inc.
- Bristol Bay Regional Seafood Development Association
- Cordova District Fishermen United
- Yakobi Fisheries LLC. Wild Caught Alaskan Seafood
- Alaska Marine Conservation Council
- Taku River Reds
- Sitka Conservation Society
- Indigenous Sentinels Network
- Central Bering Sea Fishermen's Association
- Su Salmon Co.
- Copper River Seafood Marketing Association

- SalmonState's Salmon Habitat Information Program (SHIP)
- Alaskans Own
- Central Bering Sea Crabbers
- Alaska Longline Fishermen's Association
- United Cook Inlet Drifters Association



SkipperScience Platform: The *SkipperScience* mobile application (“app”) provides a platform for fishermen to document physical and biological phenomena they observe while fishing through either an iOS or Android operating system smartphone or tablet. We adapted existing technology created by the *Indigenous Sentinels Network (ISN)*, to provide fishermen a platform to document observed environmental changes and anomalies through words, photos, waypoints and other data and information avenues. The *ISN* was developed by our partners at the Aleut Community of St. Paul Island (ACSPI) in the Pribilof Islands, in collaboration with the St. George Traditional Council and Community and Ecology Resources, LLC, and has been operating successfully for over 20 years in the Bering Sea and Interior Alaska. *ISN* is an online, password protected database with mobile and web-based tools that enable non-scientists in remote locations to record and communicate environmental and biological data to scientists, managers, decision-makers, and the public. The *ISN* has a proven history of success in providing valuable data to local-decision making.

SkipperScience Pilot: In 2016, the Aleut Community of St. Paul Island, Alaska SeaGrant and Aleutian Bering Sea Initiative successfully piloted a *SkipperScience* trial in Unalaska (the largest fisheries port in the U.S.) as a possible expansion of *ISN* to the fishing industry. After that pilot program, skippers were enthusiastic to expand the program and increase the types of scientific data collected. In 2021, SalmonState entered a partnership with ACSPI to expand the initial pilot season to Southeast, Prince William Sound, Bristol Bay, and other Alaska ports, with a focus on

documenting climatic changes affecting fisheries. Based on the needs identified, we refined the piloted *SkipperScience* protocols for fishermen to log real-time observations while at sea and launched the program during the 2021 fishing season.

The 2021 SkipperScience Program was initiated as a collaboration between the Aleut Community of St Paul Island, SalmonState, the Aleutian Bering Sea Initiative (ABSI) and Sitka Conservation Society. Together, staff and interns from these organizations developed an ambitious plan and timeline to recruit 100 fishermen from our communities, develop and implement outreach through social media, news and other printed media, emails, phone calls, text messages and website engagement. Recruitment calls were the most effective method for inviting fishermen to be a part of the *SkipperScience* pilot program. Once fishermen were enrolled in the program, all participants received consistent and ongoing individualized support and technical assistance with data collection throughout the summer. Fishermen were provided with step by step instructions for signing up for the program; interns followed up individually to answer questions and walk through how to log an observation while in the field or after returning from a fishing trip; and fishermen were provided thoughts and insights to what kind of information and data would be useful to record.

YOU HAVE THE EXPERTISE

Skipper Science Partnership

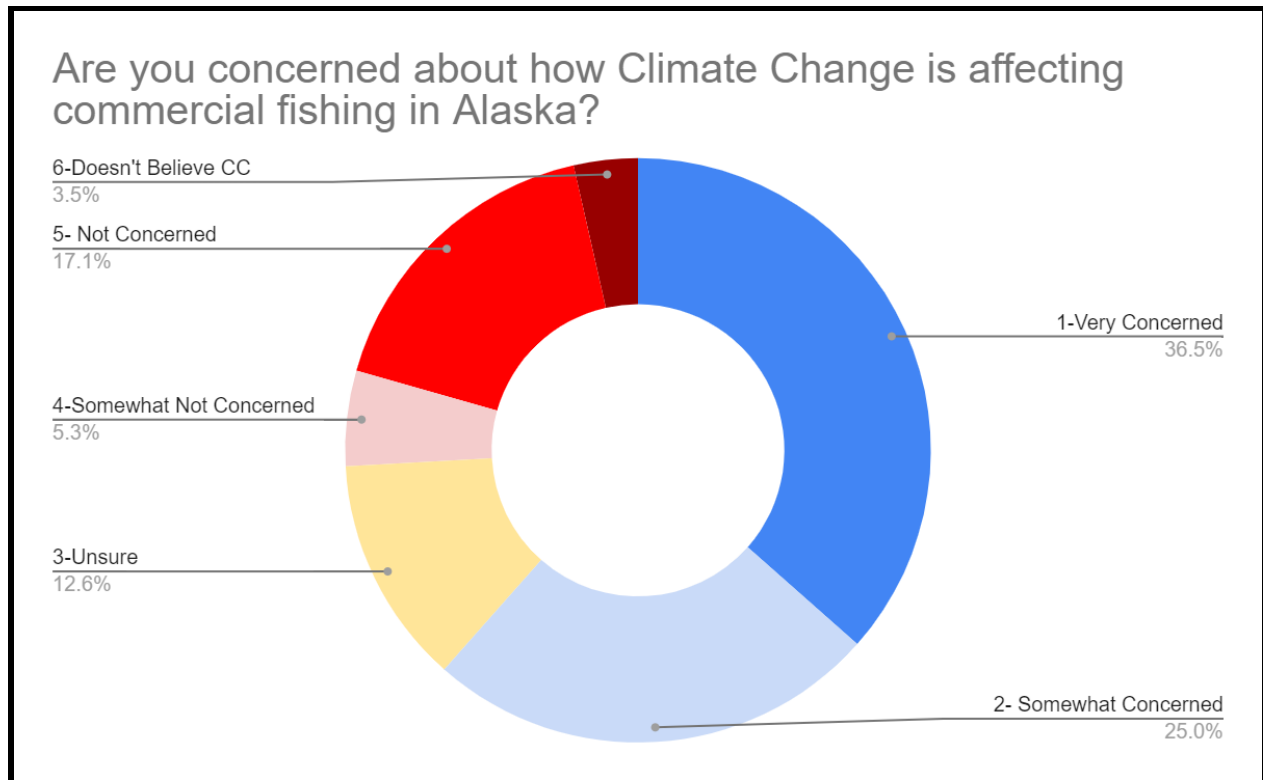
Our oceans are changing. Sign up and start recording data next time you're out on the water. This information will be used to help steer the ship when it comes to policies that protect our salmon, support our fisheries, and empower fishing communities.

SKIPPERSCIENCE.ORG

The image above is one of the Instagram and Facebook advertisements used for recruiting fishermen to the

SkipperScience Program.

Climate Surveys: We talked to 1,697 fishermen that were available through a database of Commercial Fisheries Entry Commission, CFEC permit holders, Individual Fishing Quota holders and Commercial Fishing Crew License holders from February 23 to September 14, 2021, specifically asking them to describe their level of concern for how climate change is impacting commercial fisheries in Alaska. Of the fishermen we spoke with 69% identified as permit holders, 10% as crew members and 21% as both. We asked, “Are you concerned about how climate change is affecting commercial fishing in Alaska?” Over 61% of commercial fishermen indicated they are either “very concerned” (36.5%) or “somewhat concerned” (25.0%).



Survey results showed over 61% of commercial fishermen are either “very concerned” (36.5%) or “somewhat concerned” (25.0%) about climate change impacting their fishery in Alaska.

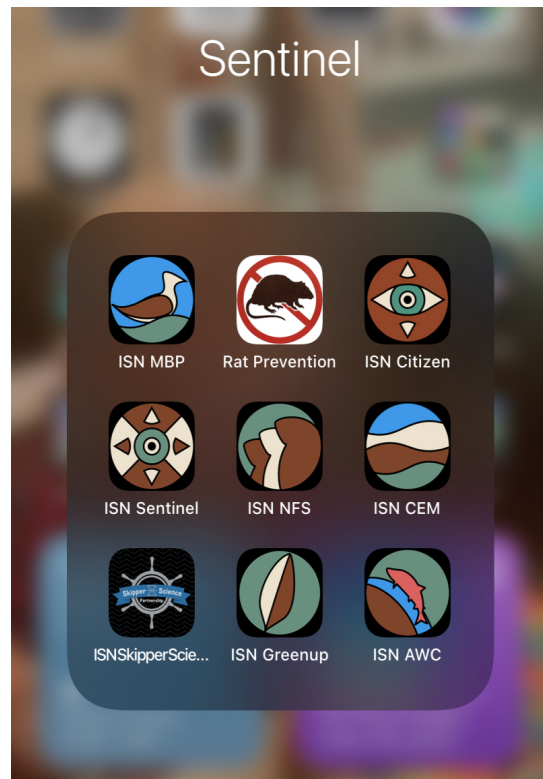
Project Highlights

- 100 fishermen signed up for the program
- 19 Alaska-based fishing trade organizations supported and endorsed the program demonstrating strong interest from the industry
- 1,697 fishermen provided their opinions on climate change via phone interviews
- 49 data entries completed in the *SkipperScience* app by participants
- 50 posts on Instagram (168 “loves”; 64 followers; 74 views of video posted)
- 115 individuals “liked” the Facebook page
- Facebook posts (top posts reached 200+ to 6,100+ people) up to 185 post clicks per

post, up to 173 reactions, comments and shares per post

Methodology

SkipperScience was and is available for free download for either iOS or Android devices from the [Apple App Store](#) and via [Google Play](#), respectively. The SS app provided the team a single platform for fishermen to systematically document physical and biological phenomena on the water.



Screenshot showing the SkipperScience app, which is now part of a suite of apps used for community-driven or citizen science monitoring and data collection efforts. SkipperScience appears in the lower left corner of the suite of apps.

Phase I: The project team created a list of potential participants to target for recruiting prior to the start of the commercial fishing season. Targeted fishermen were recruited via emails to fishing trade organizations, phone calls, social media, Alaska Fisheries Report underwriting, traditional news stories, harbor and dockside posters and word of mouth. Social media ads targeted State of Alaska CFEC permit holders, crew license holders, and Federal IFQ holders. The recruitment phase was concentrated from June to July, 2021, after which point we promoted continued registration so the program was open and available to new participants, but we turned our focus on outreach to promote observation logging in the database through the app.

Phase II: Once summer fishing was fully underway, we turned our focus from signing up new participants to encouraging existing participants to log observations during or after fishing trips. Once individuals successfully signed up for the program via the [SkipperScience online sign up form](#), participating fishermen received consistent individualized support and technical assistance with data collection throughout the summer. Throughout the season, in season highlights were provided via social media.

Phase III: As the fishing season came to a close, we sent announcements and individual reminders to participants via phone calls, emails, and text messages to log any remaining observations in the SkipperScience app. We concluded the official collection of pilot observations on September 7, 2021. After this time, we held a drawing for participants that logged more than 3 observations over the course of the summer season for a \$200 gift card as a thank you for participation.



The image above is one of the Instagram and Facebook advertisements used for encouraging participation during Phase II of the 2021 SkipperScience pilot season.

[1] Developed jointly by the Aleut Community of St. Paul Island in collaboration the St. George Traditional Council and Community and Ecology Resources LLC in 2003.

In Season Media Highlights:

● Press Release: New SkipperScience Program kicks off this summer with on-the-water climate observations – Salmon Habitat Information Program
● Alaska Public Radio Alaska News Nightly: Monday, June 21, 2021
● KCAW Public Radio Sitka With help from a new app, fishermen can track changing ocean conditions in real time
● The Cordova Times New program aims to engage fishermen as scientists
● Alaska Fish Radio SkipperScience phone app adds fishermen's real-life observations to science data
● Anchorage Daily News New app lets Alaska mariners report real-time changes in the marine ecosystem
● KCAW Public Radio Sitka SkipperScience app hopes to bridge gap between fishermen and scientists
● Alaska Journal of Commerce FISH FACTOR: New app aims to track real time marine observations
● The Arctic Sounder Newspaper App lets mariners report changes in marine ecosystem
● KDLG Public Radio in Dillingham Bristol Bay Fisheries Report: July 14, 2021
● KDLG Public Radio in Dillingham Fishermen as scientists? A new app gathers climate observations from skippers at sea

Observations and Data

Summary of Observations: There were 49 observations logged from June 1st to September 3rd, 2021 (see Figure below). Of those observations, weather (12 observations) and seabirds (10 observations) were the most common focal objects. Other observations include fish (12), marine mammals (7), sharks (3), horseflies (2), turtles (2), and mammals (1).

Mobile-43380

General Information

Community	Skipper Science
Program	Skipper Science
Timezone	America/Anchorage (GMT-08:00)
Start Date/Time	Jul 4, 2021, 1:45:39 PM
End Date/Time	Jul 4, 2021, 1:45:42 PM

Environmental Conditions

Air Temperature	(no selection)
Weather Method	Other Method
Wind Speed	(no selection)
Wind Direction	(no selection)
Sea State	(no selection)
Tide	(no selection)
Water Temperature	(no selection)
Water Measurement Type	(no selection)
Weather Conditions	high overcast

Data Collection Team

Data Entry	
Observer 1	
Observer 2	(no selection)
Observer 3	(no selection)
Observer 4	(no selection)
Observer 5	(no selection)
Observer 6	(no selection)

Comments

More fish around than last week. First set = 70 chums, 2 pinks, 5 sockeye, 1 king

Mobile-Detail-80663

General Information

Start Date/Time	Jul 4, 2021, 1:47:37 PM
Photos	(no selection)

GPS Data

Latitude	58.5923423
Longitude	-134.90550808
Altitude	17.6713
Accuracy	4790.6773

Observation Details

Species/Object	Sockeye/Red Salmon (<i>Oncorhynchus nerka</i>)
Presence/Absence	present
Confidence	Sure
Sex	(no selection)
Age Class	(no selection)
Best Count	0
Exact Count	(no selection)
Minimum Count	(no selection)
Maximum Count	(no selection)
Count Units	Number

Location

Region	Southeast Region
Vantage Point 1	(no selection)
Vantage Point 2	(no selection)
View	(no selection)
Observer Location	boat
Location Notes	Southern Lynn canal north of Juneau

Example observation from the ISN database where all SkipperScience data are stored. This observation detailed salmon catches for chum, pink, sockeye and king salmon in southern Lynn Canal north of Juneau on July 4, 2021.

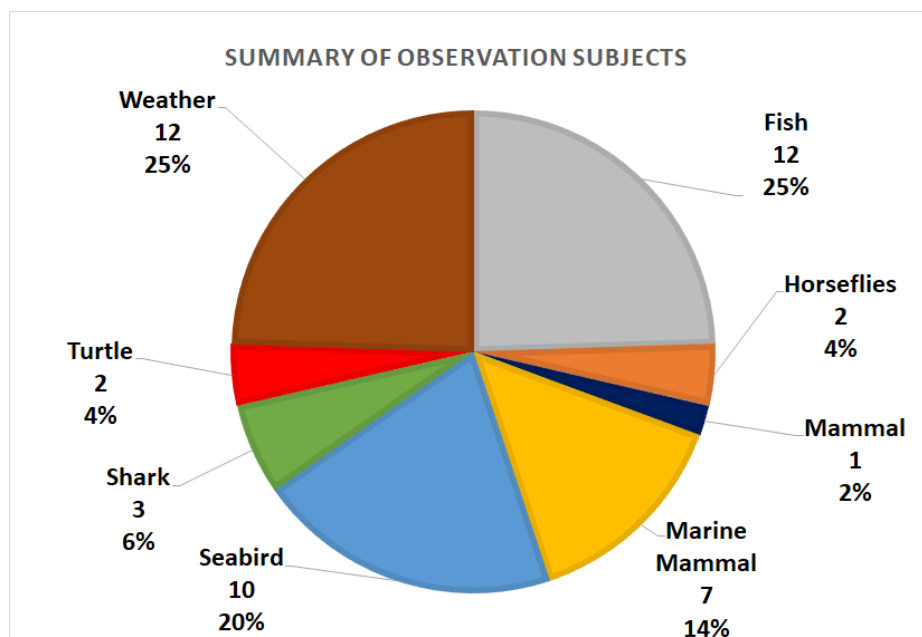
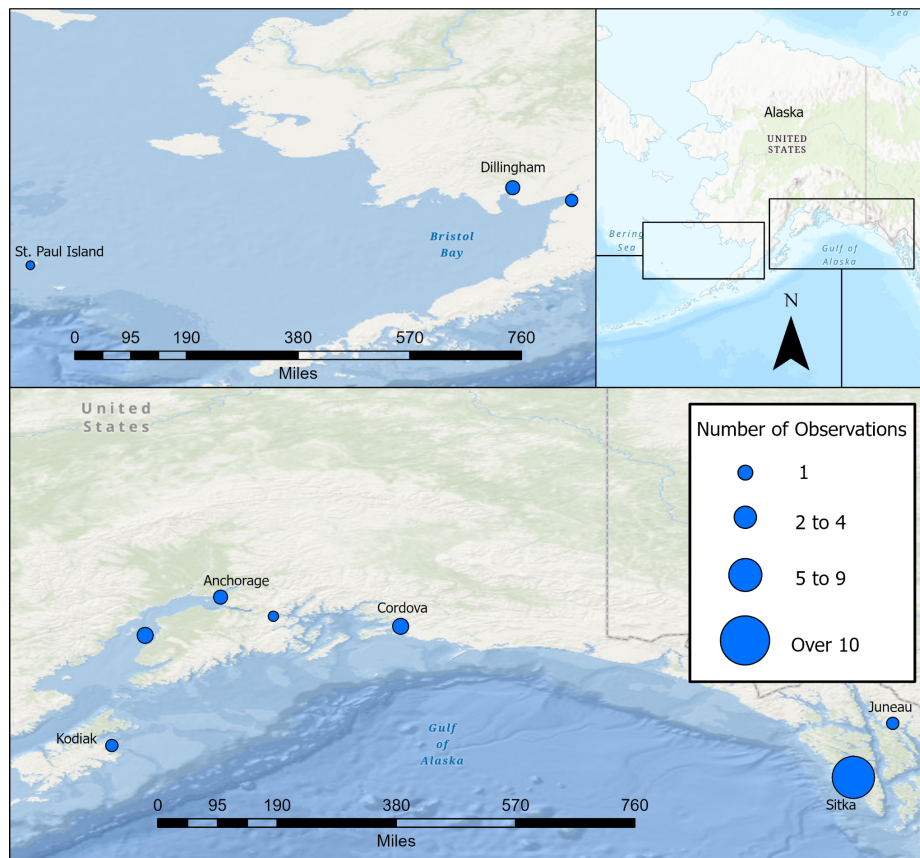


Figure showing the focal object of observations logged in the SkipperScience database during the 2021 pilot season.



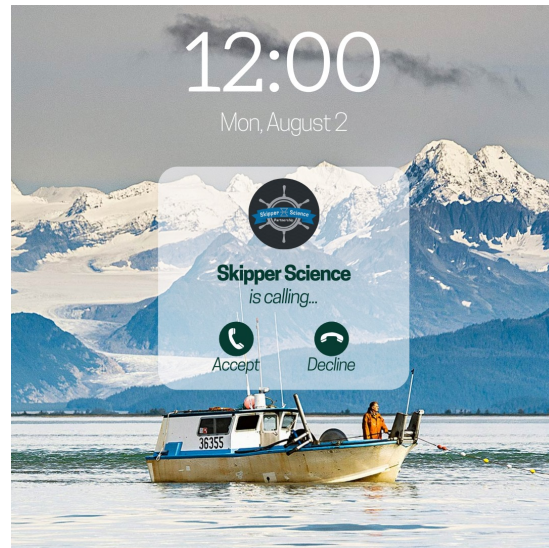
Example of an observation logged in the database picturing king salmon with a lice infestation.



Map of Alaska showing the number and locations of observations logged during the 2021 SkipperScience pilot season.

Lessons Learned

Personal Tech Support: The success of the program hinged on personal contact with our participants throughout the season. Calls, emails, text messages and in-person communication (when feasible) were the most successful methods the team could utilize. We had originally planned on constant dockside communications and possible boat trips with skippers and crew during the season, which were not possible due to COVID restrictions and precautions.



Recruitment calls were the most effective method for inviting fishermen to be a part of the partnership. Once individuals successfully signed up for the program via [the SkipperScience online sign up form](#), participating fishermen received consistent individualized support and technical assistance with data collection throughout the summer. We found that regular and personalized communication was very successful in keeping our participants engaged.

Encouraging internal GPS location use in the future: Out of the 49 observations, 7 had GPS coordinates entered with them at the time of logging. Some of the observations had location descriptions or landmarks detailed in the comments field of the observation. The project team thinks that perhaps for many users, the app location permissions were turned off and thus the button that is used to 'grab GPS coordinates' from the internal GPS was not accessible. Seven additional observations were entered on the web app after a fishing trip and did not include GPS coordinates. Observations that are logged after a trip (i.e., not in the field) and that may be contributing to less GPS data collection as coordinates cannot be automatically collected from the web app since the participant is no longer in the field. In the future, we will communicate often and clearly with our participants that all GPS coordinates will be kept confidential and masked at a coarse scale to protect specific locations.

Tutorial videos on logging observations: Our project team spent a significant amount of time troubleshooting with our participants in Phase I as we rolled out the sign-up process. We experienced a bit of difficulty with getting user passwords reset once a user signed up initially. Phase I would have benefited from a simple step by step video explaining the process with visuals to show users what they should be seeing on each screen as part of sign up.

Next Steps

Many Alaskan fishing grounds have long-term stock assessment surveys, but capture only a snapshot of what happens in the ocean year to year. Fishermen are making invaluable observations year-round and generally at a finer scale than is covered by stock surveys. We piloted SkipperScience during the summer months, but hope to expand to data collections throughout the year across multiple fisheries. SkipperScience presents a unique opportunity for managers to work with the fishing industry to systematically incorporate these observations into much-needed data to better inform management efforts in the rapidly changing Bering Sea. Now that the program has shown high interest and participation, we seek to expand the scope and geographic range of SkipperScience. The wealth of fishermen's knowledge has great potential to deliver necessary climate-related information to fulfill state and federal fisheries' mandates, and provide decision-makers with the information they need to increase resilience to changing climate and ocean conditions. Outcomes will inform future risks and management strategies for use in fishery stock assessments and fisheries management decisions. It will also promote the kind of collaborative research and monitoring that brings industry, communities, tribes and managers into a productive working relationship that builds the trust that is so critical for the sustainability of fisheries management.

In the immediate future, the project team is working to secure a small contract with NOAA to host a workshop that brings together representatives from fisheries organizations who participated in the 2021 SkipperScience program alongside NOAA scientists and managers. We also plan to host a series of one-on-one and small group meetings focused on knowledge exchange between fishers, scientists, and managers. The final product will be a report to NOAA of recommendations developed from insights from these two groups about data collection opportunities that could be undertaken in future years using the SkipperScience program and platform.