Using Technology to Fulfill Research Needs in the Alaska Salmon Gillnet Fishery

Background

The Alaska Fisheries Development Foundation (AFDF) is the client for the Marine Stewardship Council (MSC) sustainability certification program for the Alaska salmon fishery. At the time of the project start, one of the conditions of certification for Alaska salmon was to increase understanding of interactions between fishermen and Endangered, Threatened, or Protected species to reduce potential bycatch mortality. This includes the International Union for the Conservation of Nature Red List seabirds, which for Alaska includes Marbled and Kittlitz's murrelets. Of salmon fishery gear types in Alaska, the gillnet fishery has been identified as posing the largest potential risk to seabirds. SkipperScience, an extension of the Indigenous Sentinels Network (ISN), is a citizen science project involving many public, private, and tribal organizations. Observations and data are recorded in the SkipperScience mobile smartphone app and provides non-scientists in remote locations a way to systematically record and share environmental and biological data. Data standards and protocols have been built in so that this data can be shared with scientists and managers. These organizations partnered to create a targeted SkipperScience app for gillnet fishermen to log murrelet observations, interactions and bycatch in order to better understand the potential impacts of the Alaska salmon gillnet fishery on Marbled and Kittlitz's murrelets.

Methodology

A total of nine skippers of Alaska salmon gillnet fishing vessels participated in the project through the 2023 summer season from June 1st through September 30th. Four of the participants are active fishermen in the Prince William Sound area, and five in the Southeast region. For this pilot effort, skippers were identified by key industry members from various gear groups in Southeast and Prince William Sound, and invited to participate in the project. Skippers were compensated for their participation with $100/day of logging, regardless of number of sets, for up to 25 days. AFDF and ISN partners developed a prototype of the app based on data fields used in the Alaska Marine Mammal Observer Program in order to make the data comparable between the two efforts. Additionally, US Fish & Wildlife Service seabird researchers reviewed the proposed fields to prioritize collection of the most valuable data. Fields included fishing district and GPS location of set, type of environment (channel, bay, etc), net deployment date & time, observed presence of seabirds, species and quantity observed, ID confidence, net retrieval time and depth, and number and condition of seabirds in bycatch events.

The nature of this project requires the trust of the fleet, and the project team prioritized anonymity of participants and set deployment locations. Project data is available upon request, however, exact coordinates of set deployments will not be provided without permission of skippers to release precise location data. Alternatively, locations aggregated by generalized fishing areas. The skippers were trained by the ISN staff to use the app, and they logged seabird

observations and interactions from net deployment to net retrieval during each set on the days they elected to log.

Data was saved in the app until the skipper had cell phone service, at which point they uploaded all data to the ISN server, where project team members retrieved it. In addition to the quantitative data collected in the app, a set of qualitative data was collected through exit interviews with each participant at the conclusion of the fishing season. This served to validate data recorded in the app, and collect data on methods skippers currently use to minimize bycatch. Eight interviews were conducted over the phone, and one via online survey. Interviews lasted from 15-30 minutes, and included a minimum of ten consistent questions covering fishing background, experience with data collection, data verification, methods for avoiding bycatch, feedback on the app, and interest in a Phase 2 of the project.
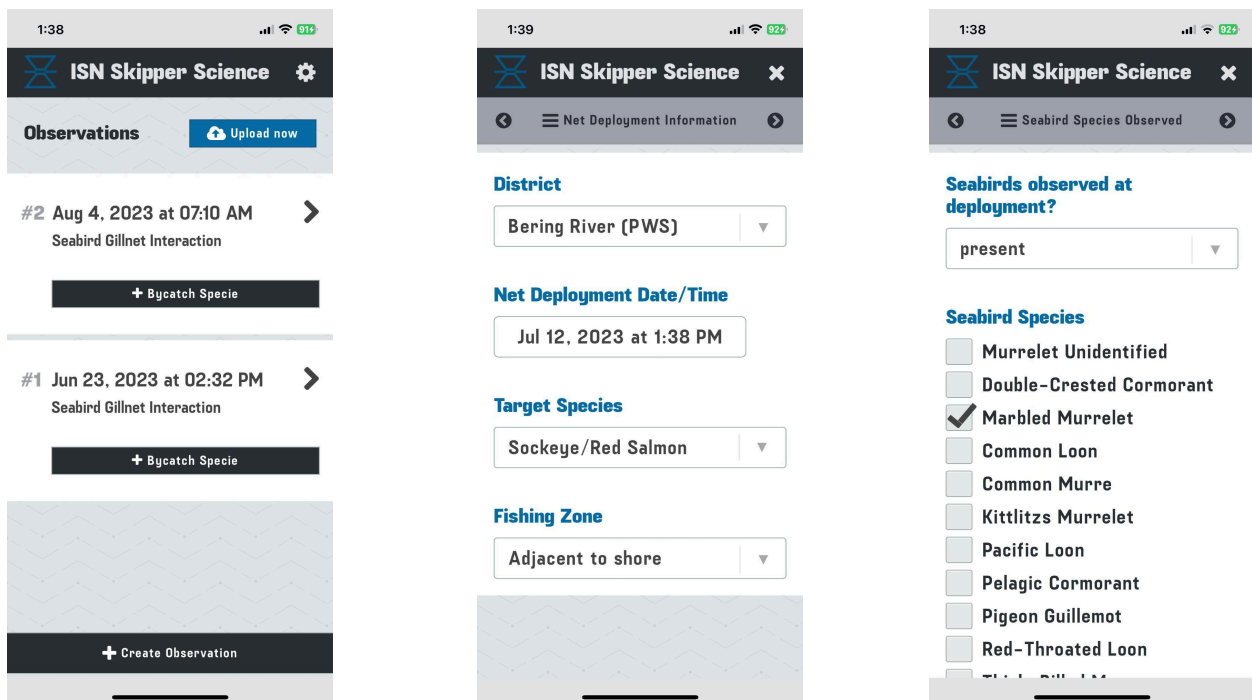

Figure 1: Three sections of the Skipper Science App used to 1) start a new observation or upload an observation; 2) Log Fishing District, Net Deployment Time, Target Species and Fishing Zone; and 3) log any seabirds observed in the area at net deployment.

Summary of Findings

Out of a total of 563 recorded hauls, three bycatch events of an individual bird were reported, two in Prince William Sound and one in Southeast Alaska. Two birds were identified as Marbled murrelets and one as an unidentified murrelet species. The birds were found dead in the net. No live bycatch events were reported. Recorded bycatch events were verified during the exit interviews. Participants cited three methods for avoiding bycatch: avoid night sets, do not set the net in a group of birds, and observe birds and adjust fishing activity accordingly to avoid their behavior in that area. Full data set is available here.

Participant	Number of observed hauls over 3 months (June 1-September 30)	Number of bycatch events reported (individual birds)	Species of Bycatch, Condition	Location
1	110	1	Unidentified Murrelet, Dead	Southeast
2	85	0		
3	64	2	Marbled Murrelet, Dead	Prince William Sound
4	26	0		
5	40	0		
6	94	0		
7	96	0		
8	47	0		
9	66	0		
Grand Total	**563**	**3**		

Table 1: Summary of total number of hauls observed, and number of bycatch reported with bird species and condition.

How likely would you be to participate again?

(y-axis: Rate of Response, x-axis: Scale of 1-5)

How much did maintaining the MSC certification motivate you to participate?

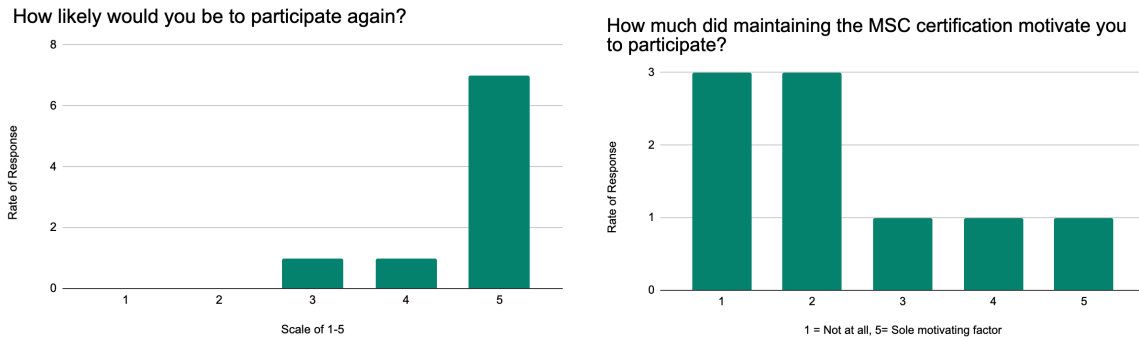(y-axis: Rate of Response, x-axis: 1 = Not at all, 5= Sole motivating factor)

Figure 2: Bar graphs showing responses from qualitative data collected through exit interviews pertaining to participant motivations to engage in the project, and likelihood of future engagement.

Conclusion

In addition to collecting important quantitative and qualitative data on seabird-gillnet interactions in the Alaska salmon fishery, this project piloted a fishery dependent data collection methodology that is replicable and effective in a data-deficient fishery. Participants reported overall satisfaction with the experience, and many expressed interest in participating again. Feedback collected from participants has been used to improve user experience within the Skipper Science app, and the exit interviews proved to be an effective method for collecting qualitative data and further building trust between the project team and the fishing fleet. This important ecological data can be used to better understand interactions between seabirds and salmon-gillnet vessels in Alaska, inform future management decisions, as well as meet the requirements of MSC certifications regarding endangered, threatened, or protected species. A second phase of the project would build on the project design by including updates to the app fields reflecting skipper feedback, utilize an expanded group of skipper participants, and could include electronic monitoring on a subset of participating vessels in order to verify skipper-reported data and further demonstrate the value of this methodology.