



Assessing the Impact of Pingers and Fishery-related Factors on Seal and Porpoise Bycatch

A study on marine mammal bycatch in Swedish gillnet fisheries

Questions asked:

Q1. Do the pingers available on the market effectively reduce harbour porpoise bycatch?

Q2. Do pingers increase the "dinnerbell effect" for seals?

Q3. What other factors affect harbour porpoise and harbour seal bycatch?

Results

The final model with Pinger type, Soak time, Net length, number of Seals, and Depth as predictors provided the best fit to the observed data and explained 36% of the total variance in porpoise bycatch.

The final model with Pinger type, Soak time, net Length, Mesh size, and number of Porpoises as predictors provided the best fit to the observed data and explained 45% of the total variance in seal bycatch.



Harbour porpoise and harbour seals bycaught in gillnet fisheries. .



Evaluated pingers: Future Ocean and Banana pinger

Methods

Pingers were tested in commercial fisheries. Ten fishermen kept minutes and had cameras and GPS mounted on their vessels filming net hauls both with and without pingers.

Generalized Additive Mixed Model was used to analyze factors affecting bycatch. Dependent variable: Number of bycaught seals or porpoises

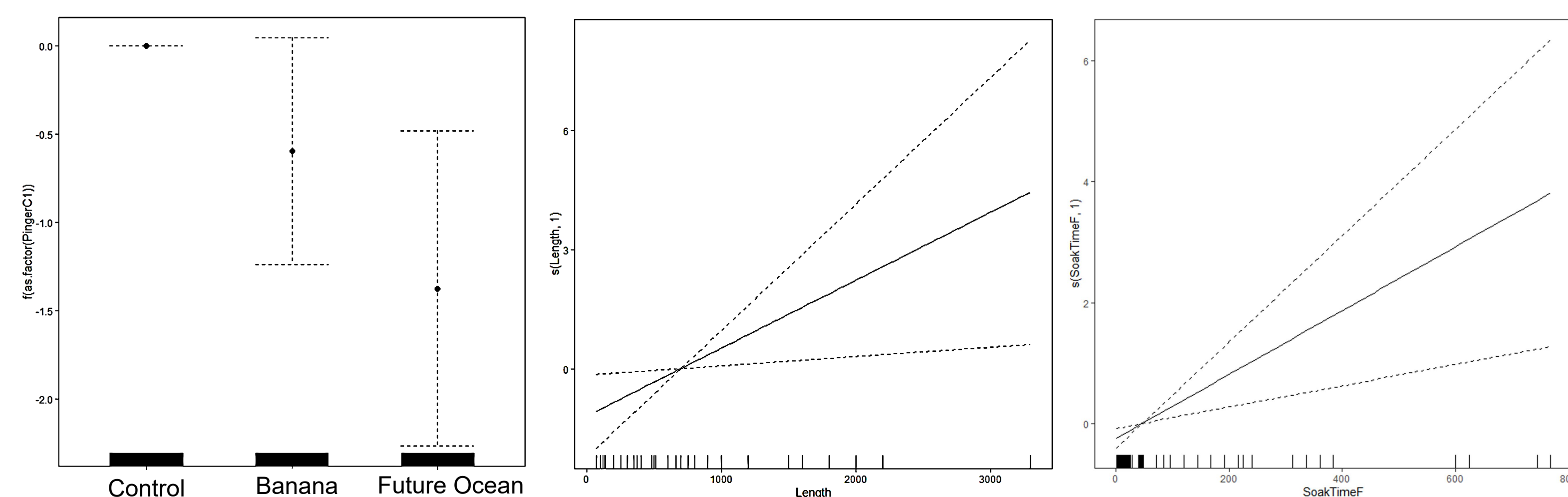
Predictor variables: pinger type, Soak time, net Length, net Height, Mesh size, Year of sampling, Seal/Porpoise number, Depth, Distance to shore

Questions answered:

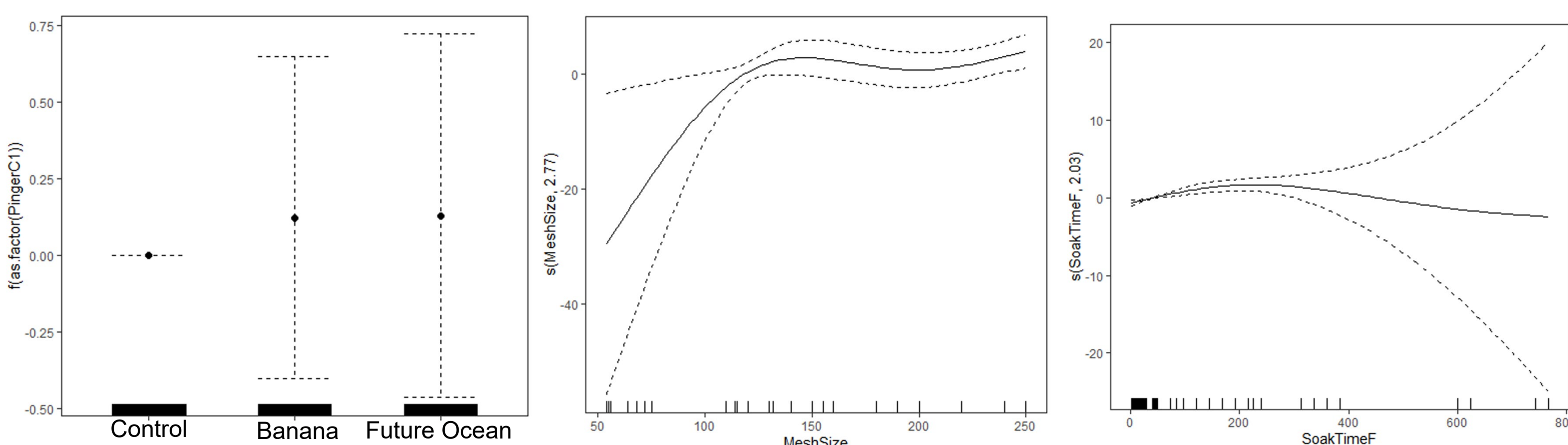
Q1. Both Future Ocean and Banana pingers reduce porpoise bycatch. Future Ocean pinger had a significant effect on the bycatch ($p < 0.01$), the effect of banana pinger was marginally significant ($p = 0.06$).

Q2. There is no evidence of a "dinnerbell effect" on seals.

Q3. Porpoises are more often caught in nets set in deep waters. Long nets and soak times increase porpoise and seal bycatch. Seals, are more often caught in nets with large meshes, porpoises as well (marginally significant). When a seal is caught, the likelihood of also catching a porpoise increases, and vice versa



Some predictors for number of bycaught porpoises. Dotted lines show 95% confidence intervals. The effect is on the log scale. Partial effect of, 'pingertype,' 'Length,' and 'Soak time.'



Some predictors for number of bycaught seals. Dotted lines show 95% confidence intervals. The effect is on the log scale. Partial effect of, 'pingertype,' 'Mesh size,' and 'Soak time.'

Additional conclusions:

When the experimental setup focused on the impact of pinger effectiveness, Future Ocean and Banana pinger significantly reduced bycatch.

Pingers battery life: Banana pinger batteries lasted > 12 month; Future Ocean lasted < 4 month



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