Supplementary Text

Southern Alaska resident killer whale matrilines photographically identified in vessel survey encounters with field recordings:
AB17, AB25, AD8, AD11, AD16, AE2, AE5, AE8, AE10, AI, AJ8, AJ14, AJ20, AJ22, AJ24, AJ37, AK2, AK6, AK9, AK10, AK16, AK17, AN10, AN20, AS, AX27, AX48

Photo-identification catalogues of each matriline can be found at
https://www.whalesalaska.org/salmon-specialist-residents

Supplementary Methods

PAMGuard Whistle and Moan detector settings:
Minimum frequency: 700 Hz
Maximum frequency: 12,000 Hz
Connect type: Connect 8 (sides and diagonals)
Minimum length: 15 time slices
Minimum total size: 30 pixels
Shape stubs: Remove small stubs
Crossing and joining: Re-link across joins
Max Cross length: 5 time slices
Median filter on; Filter length 61
Average subtraction on; Update constant 0.02
Gaussian kernel smoothing on
Thresholding on; Threshold 8.0 dB
Input from raw FFT data

Supplementary recordings:

Discrete call AKS44.wav:
Discrete call type AKS44 produced by the AD8 pod of southern Alaska resident killer whales.

Discrete call AKS45.wav:
Discrete call type AKS45 produced by the AD8 pod of southern Alaska resident killer whales.

Discrete call AKS46.wav:
Discrete call type AKS46 produced by the AD8 pod of southern Alaska resident killer whales.

Table S1. One-way ANOVA results testing log of call detection rate by acoustic detector.
p-values from one-way ANOVAs for each population testing for differences in the logarithm of calling rate depending on whether the acoustic recording was identified using the PAMGuard Whistle and Moan Detector or Raven-X.

Population	*p,* calling period	*p,* recording length
Southern Alaska residents	0.2110	0.8690
Gulf of Alaska transients	0.4200	0.3340
AT1 transients	0.3400	0.3020

Table S2. Effects of signal-to-noise ratio on call detection rate.
For southern Alaska resident and Gulf of Alaska transient killer whales, the best generalized additive mixed models (GAMMs) included a smooth term for signal-to-noise ratio (SNR). The SNR value at the peak of this smooth fit was extracted (SNR at smooth fit peak), and a linear model was refit to the log of calling rate as a function of SNR, including only observations from the minimum SNR to the value at the smooth fit peak. The coefficient of SNR from this linear model is listed (linear coefficient), as well as the back-transformed coefficient. For the best GAMM of Gulf of Alaska transient calling rate with time as recording length, estimated degrees of freedom for the smooth term of SNR was 1.000; we therefore refit this model with a linear term for SNR and reported the coefficient here. SNR was not a significant explanatory variable for AT1 transient call detection rates.

Population	Measure of time	Minimum SNR	SNR at smooth fit peak	SNR coefficient (log scale)	Back-transformed SNR coefficient
Southern Alaska residents	Calling period	11.07	16.6292	0.07312	1.0759
	Recording length	11.07	15.9029	0.1339	1.1433
Gulf of Alaska transients	Calling period	10.76	14.8504	0.1131	1.1197
	Recording length	-	-	0.0959	1.1006

Table S3: Signal-to-noise ratio (SNR) of killer whale recordings.
Minimum; .025, 0.25, .50, .75, and .975 quantiles; and maximum SNR of killer whale calls in autonomous recordings of southern Alaska residents, Gulf of Alaska transients, and AT1 transients. SNR of all calls within a recording are averaged for a mean SNR per recording, and each recording is an observation in the distribution.

Population	Minimum	0.025	0.25	0.50	0.75	0.975	Maximum
Southern Alaska residents	11.07	11.57	12.52	13.34	14.76	19.50	25.01
Gulf of Alaska transients	10.76	11.16	11.86	12.48	13.25	15.96	20.72
AT1 transients	11.15	11.37	12.28	12.73	13.82	15.54	16.56

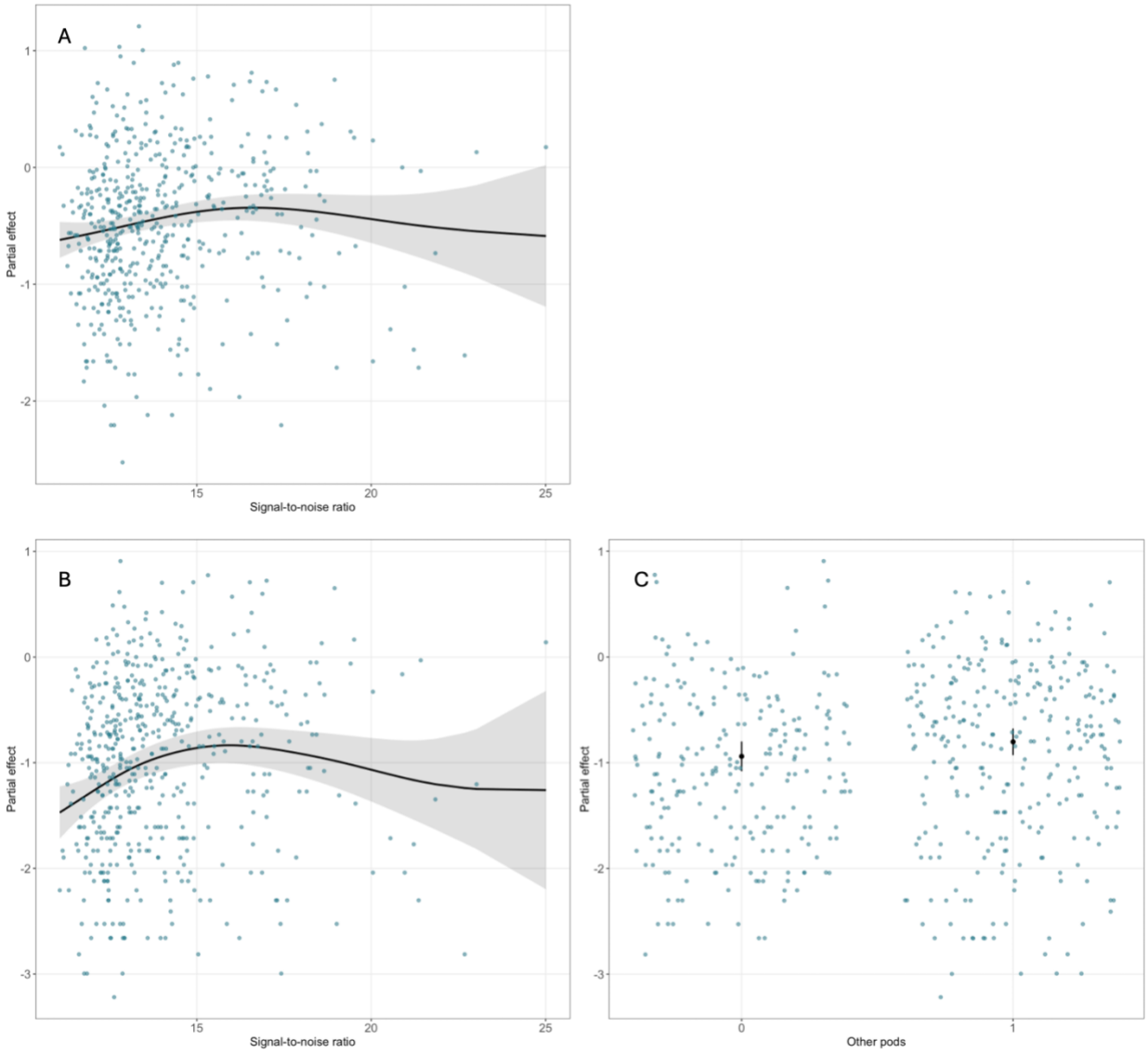

Fig. S1. Southern Alaska resident killer whale call detection rate modeling results.
Partial effects of explanatory variables included in the best generalized additive mixed models (ΔAICc = 0) for southern Alaska resident killer whale calling rate, as measured by calling period (A) and recording length (B and C). In A and B the black line indicates predicted values with the 95% prediction interval shaded in gray; in C points indicate predicted values and whiskers indicate 95% prediction intervals. Points indicate partial residuals.

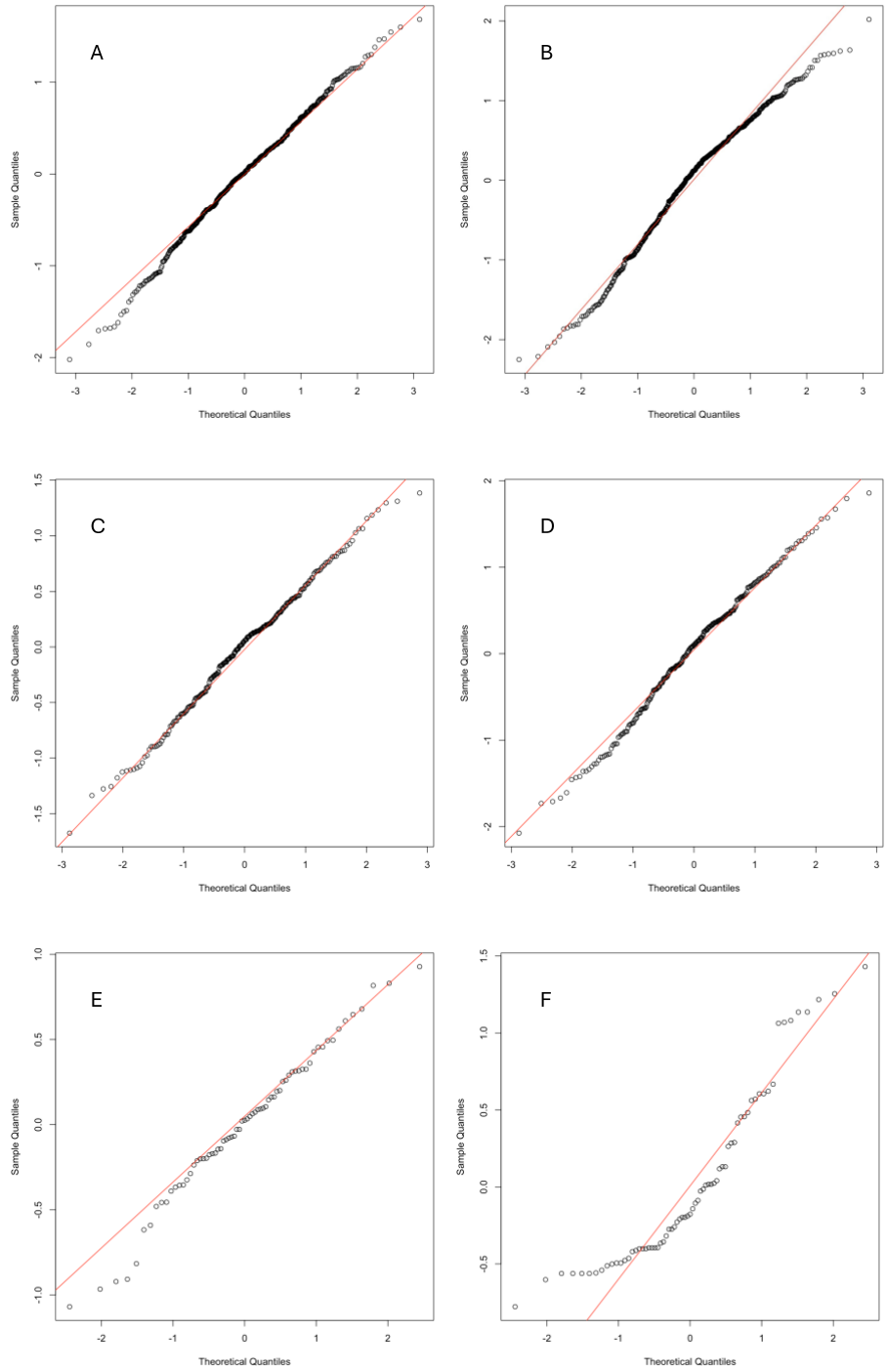

Fig. S2. Quantile-quantile plots for the best generalized additive mixed models for each population. Quantile-quantile plots suggest that residuals were approximately normally distributed for southern Alaska resident call detection rates (A and B) or Gulf of Alaska transient call detection rates (C and D) when time was measured by calling rate (column 1) or recording length (column 2). Residuals from the best AT1 transient calling rate model (E and F) showed greater variation from the normal line, but sample size was low.

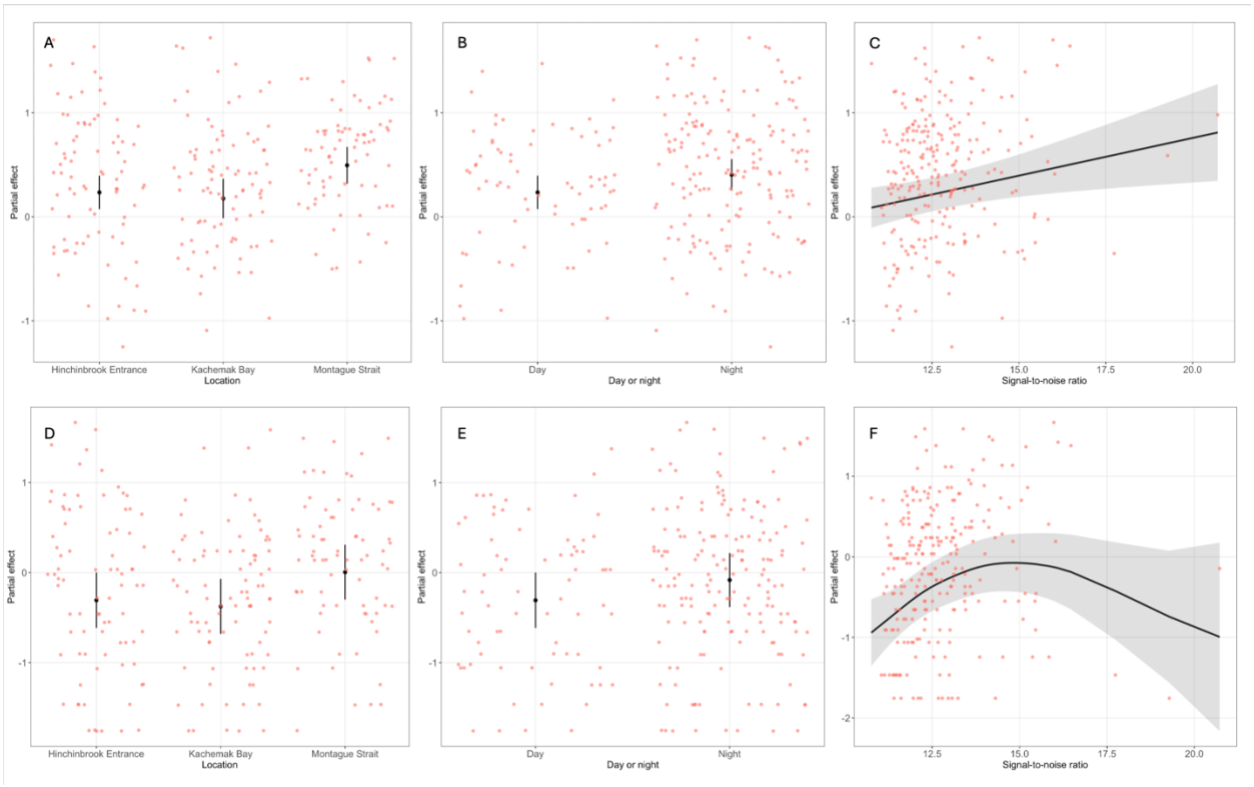

Fig. S3. Gulf of Alaska transient killer whale call detection rate modeling results.
Partial effects of explanatory variables included in the best generalized additive mixed models (ΔAICc = 0) for Gulf of Alaska transient killer whale calling rates, as measured by recording length (A-C) and calling period (D-F). In (A), (B), (D), and (E) black points indicate predicted values and whiskers indicate 95% prediction intervals; in (C) and (F) the black line indicates predicted values with the 95% prediction interval shaded in gray. Points indicate partial residuals.

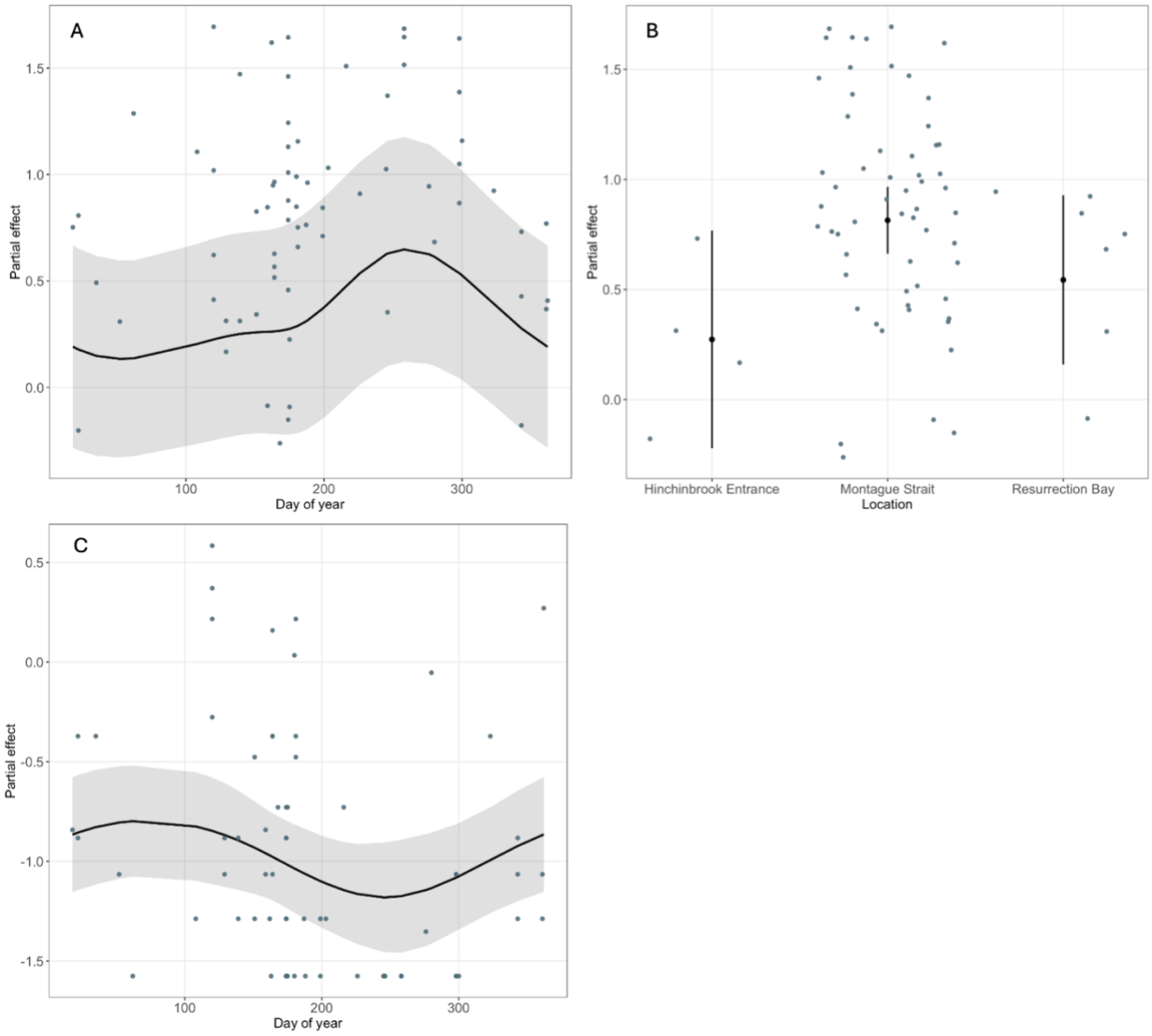

Fig. S4. AT1 transient killer whale call detection rate modeling results.
Partial effects of explanatory variables included in the best generalized additive mixed models (ΔAICc = 0) for AT1 transient killer whale calling rates, as measured by calling period (A-B) and recording length (C). In **(B),** black points indicate predicted values and whiskers indicate 95% prediction intervals; in (A) and (C) the black line indicates predicted values with the 95% prediction interval shaded in gray. Points indicate partial residuals.