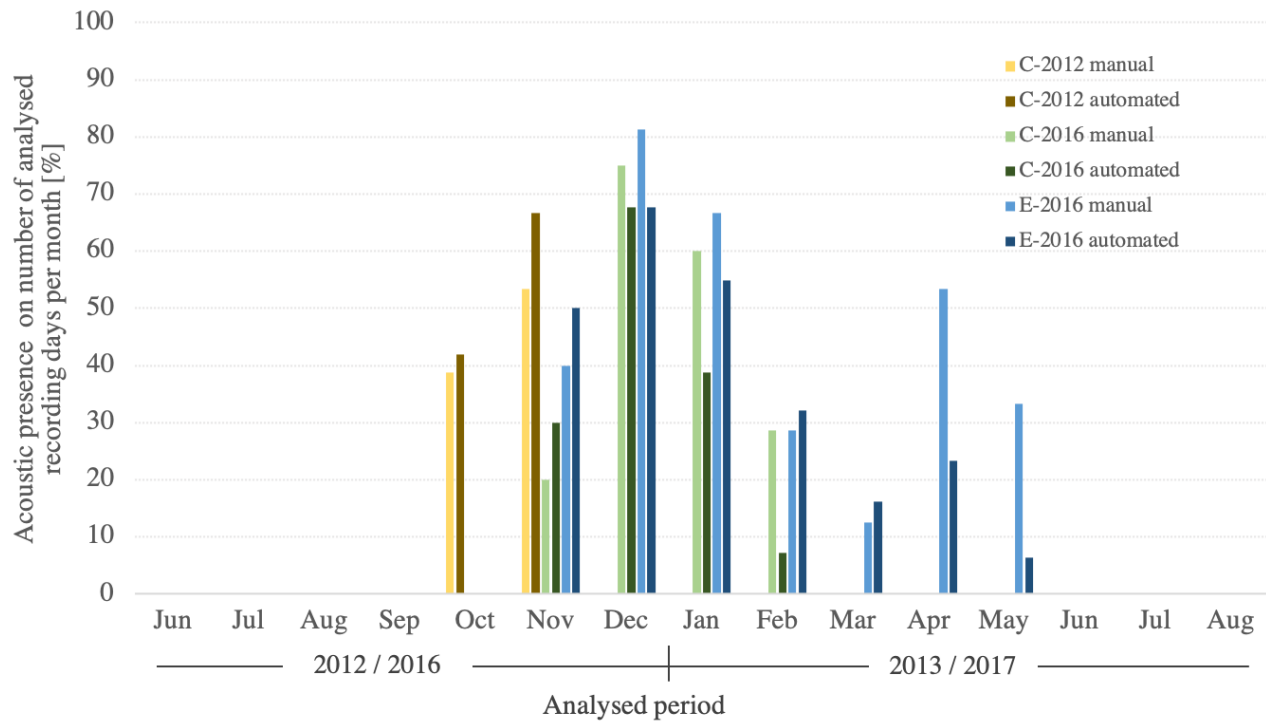


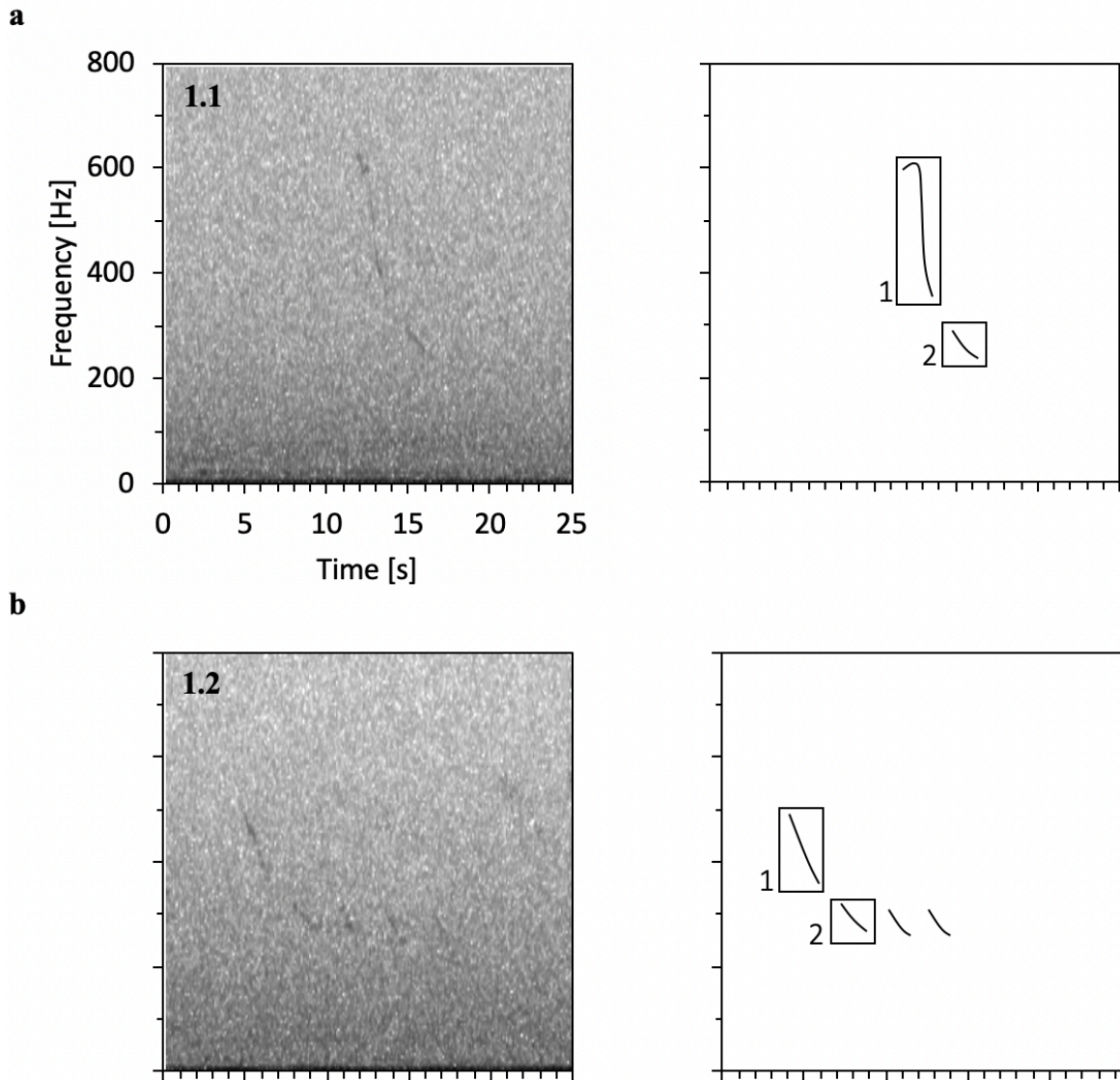
## Supplementary Material

**Table A 1.** Classification, description and frequency range [Hz] of bowhead whale calls within the call library; *n* refers to the number of exemplars in each call type. Values in the description column are given as means.

| Call type ID | Call type           | Description  | Frequency range [Hz] | <i>n</i> |
|--------------|---------------------|--|----------------------|----------|
| 01           | Up-down call        | Tonal up-down call of 0.7 s duration and a bandwidth of 37 Hz                            | 200-700              | 144      |
| 02           | Moan                | Constant call of 0.6 s duration and a bandwidth of 14 Hz                                 | 300-600              | 132      |
| 03           | Downsweep 1         | Single downsweeping unit of 0.8 s duration and a bandwidth of 58 Hz                      | 300-600              | 488      |
| 04           | Downsweep 2         | Single downsweeping unit of 0.6 s duration and a bandwidth of 38 Hz                      | 200-400              | 145      |
| 05           | Downsweep 3         | Single downsweeping unit of 0.8 s duration and a bandwidth of 104 Hz                     | 300-600              | 554      |
| 06           | Steep Downsweep     | Single steeply downsweeping unit of 0.7 s duration and a bandwidth of 204 Hz             | 200-800              | 101      |
| 07           | Curved Downsweep    | Constant call transitioning into a downsweep of 1.2 s duration and a bandwidth of 117 Hz | 400-600              | 75       |
| 08           | Upsweep             | Single upsweeping unit of 0.8 s duration and a bandwidth of 65 Hz                        | 600-700              | 60       |
| 09           | Up- and Downsweep 1 | Slight upsweep followed by downsweep of 1.0 s duration and a bandwidth of 172 Hz         | 400-700              | 181      |
| 10           | Up- and Downsweep 2 | Slight upsweep followed by downsweep of 0.8 s duration and a bandwidth of 122 Hz         | 300-600              | 154      |
| 11           | Up- and Downsweep 3 | Slight upsweep followed by downsweep of 1.6 s duration and a bandwidth of 292 Hz         | 300-600              | 37       |
| 12           | Up- and Downsweep 4 | Slight upsweep followed by downsweep of 1.4 s duration and a bandwidth of 403 Hz         | 300-800              | 24       |
| 13           | "Wave"              | Up-down-upsweep, resembles a wave, of 1.1 s duration and a bandwidth of 36 Hz            | 400-600              | 71       |



**Figure A 1. Comparison of automated LFDCS detection and manual analysis of passive acoustic monitoring data from C-2012, C-2016 and E-2016 for the daily acoustic presence of bowhead whales.** Results from automated analysis for hourly acoustic presence were also converted to represent acoustic presence on a daily basis to enable direct comparability between both approaches. Please note, that data from C-2012 stem from recording period June 2012 to November 2012, with no data available from December 2012 onwards, while data from C-2016 and E-2016 each cover the period from July 2016 to July 2017.



**Figure A 2. Bowhead whale song types, including variants, recorded by SV1088 in eastern Fram Strait (79° 00.02' N, 5° 40.12' E) between November and May 2016/17.** Each spectrographic example (left panels, spectrogram settings: FFT 1,024, overlap 90 %, contrast 55, Hann window) is supplemented by an idealized representation (right panels) of the corresponding song type. Different song units are encompassed by different boxes. For each panel, the x-axis comprises a time interval of 25 s and the y-axis a bandwidth of 0-800 Hz for every song type.

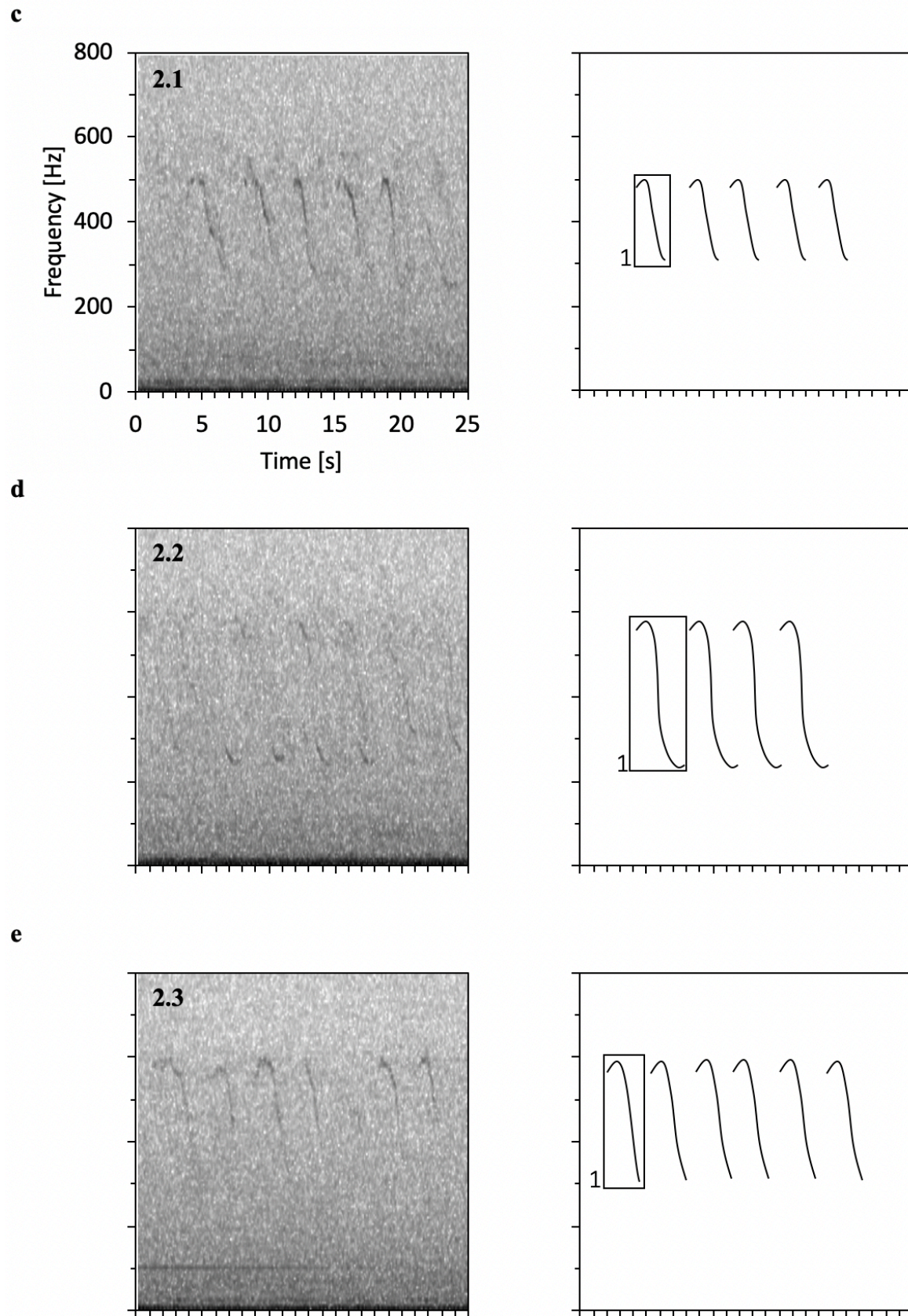


Figure A 2, continued.



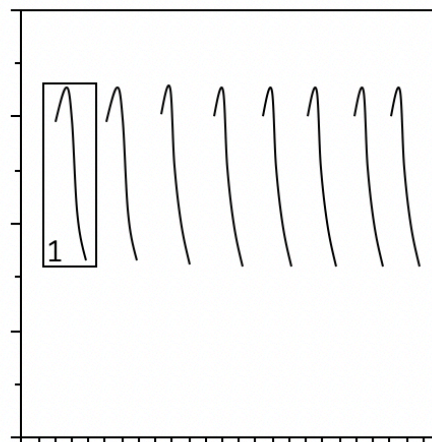
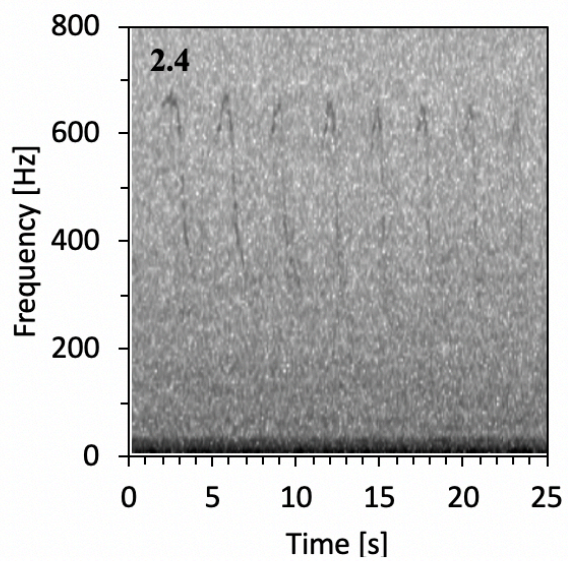
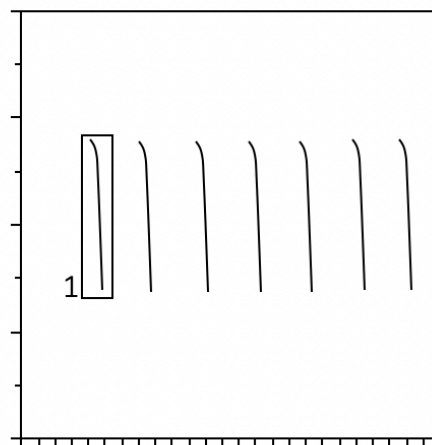
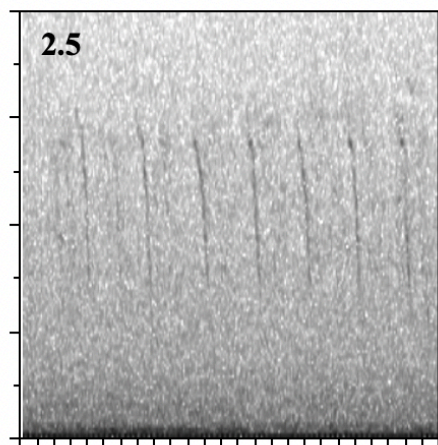
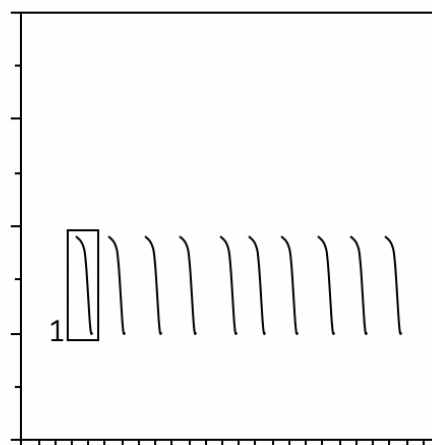
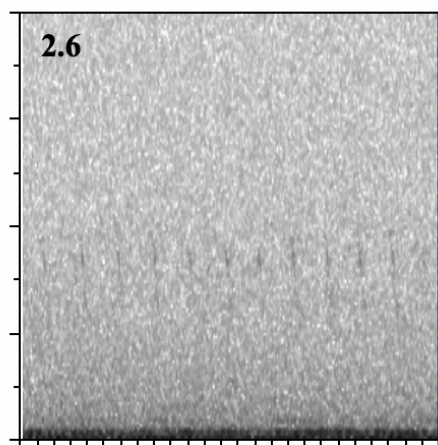
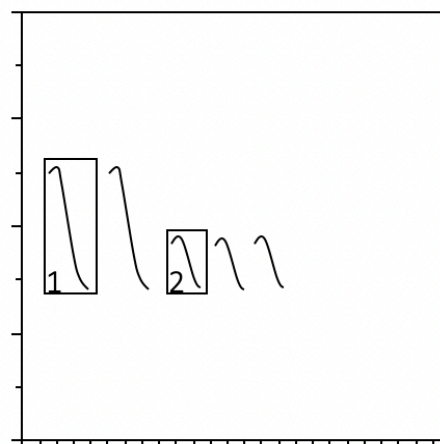
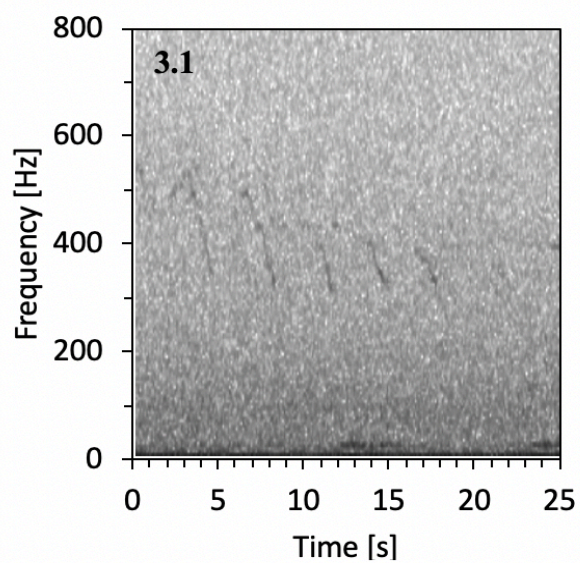
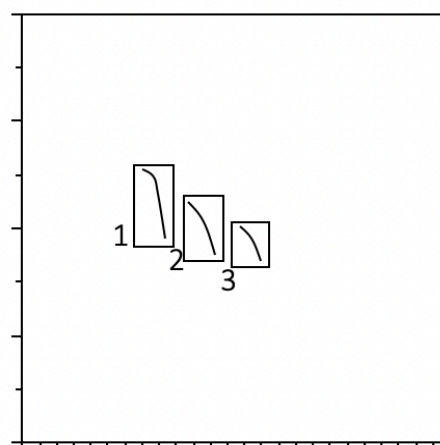
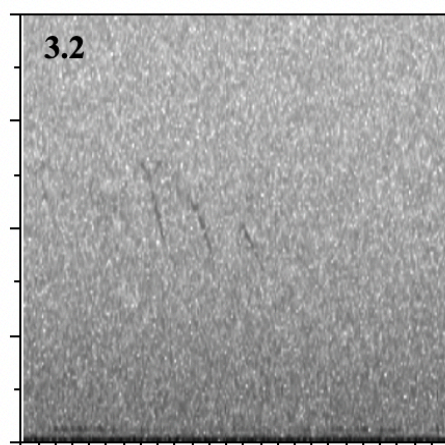
**f****g****h**

Figure A 2, continued.

**i**



**j**



**k**

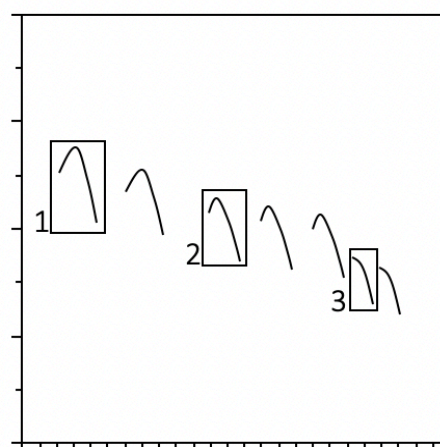
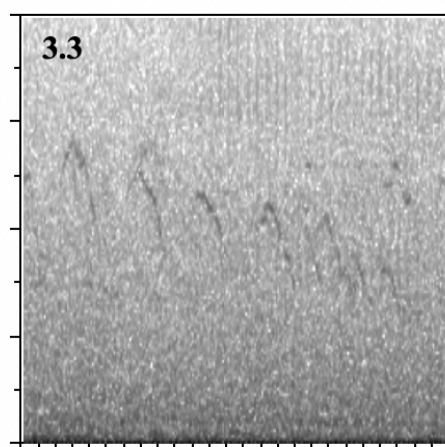
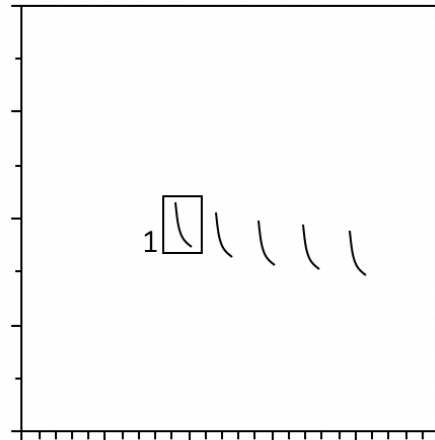
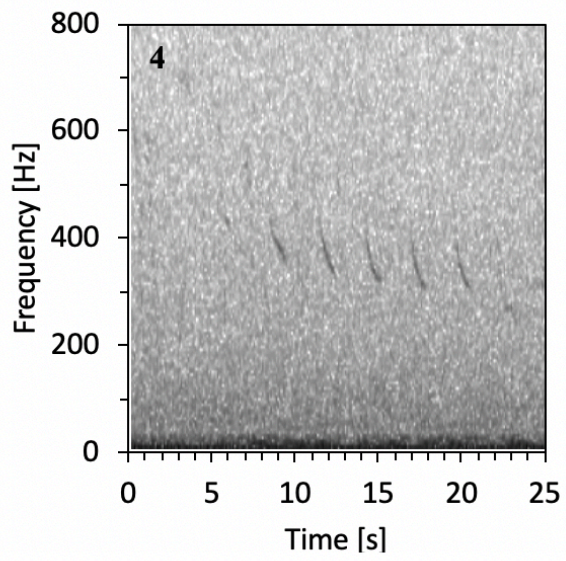


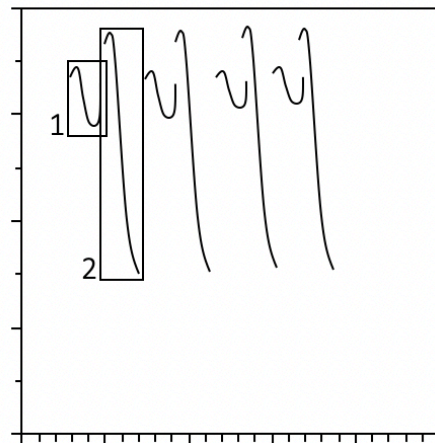
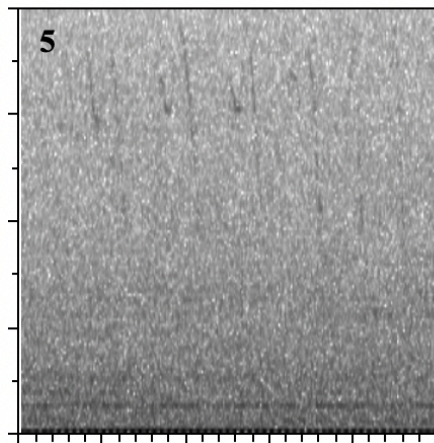
Figure A 2, continued.



**l**



**m**



**n**

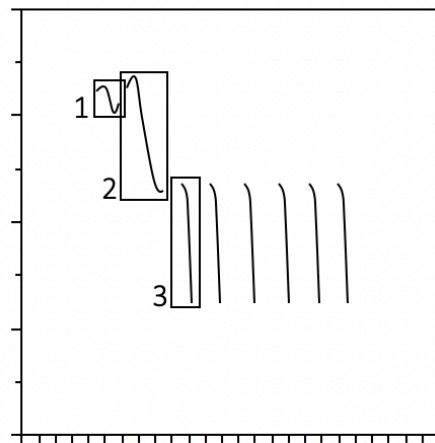
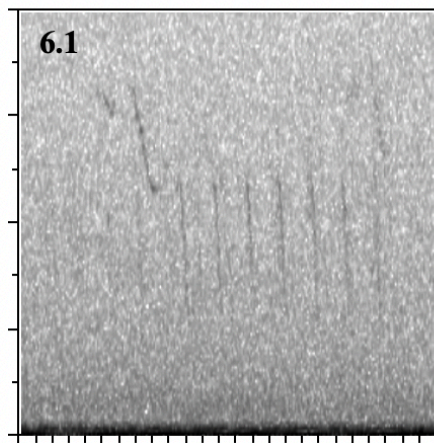


Figure A 2, continued.

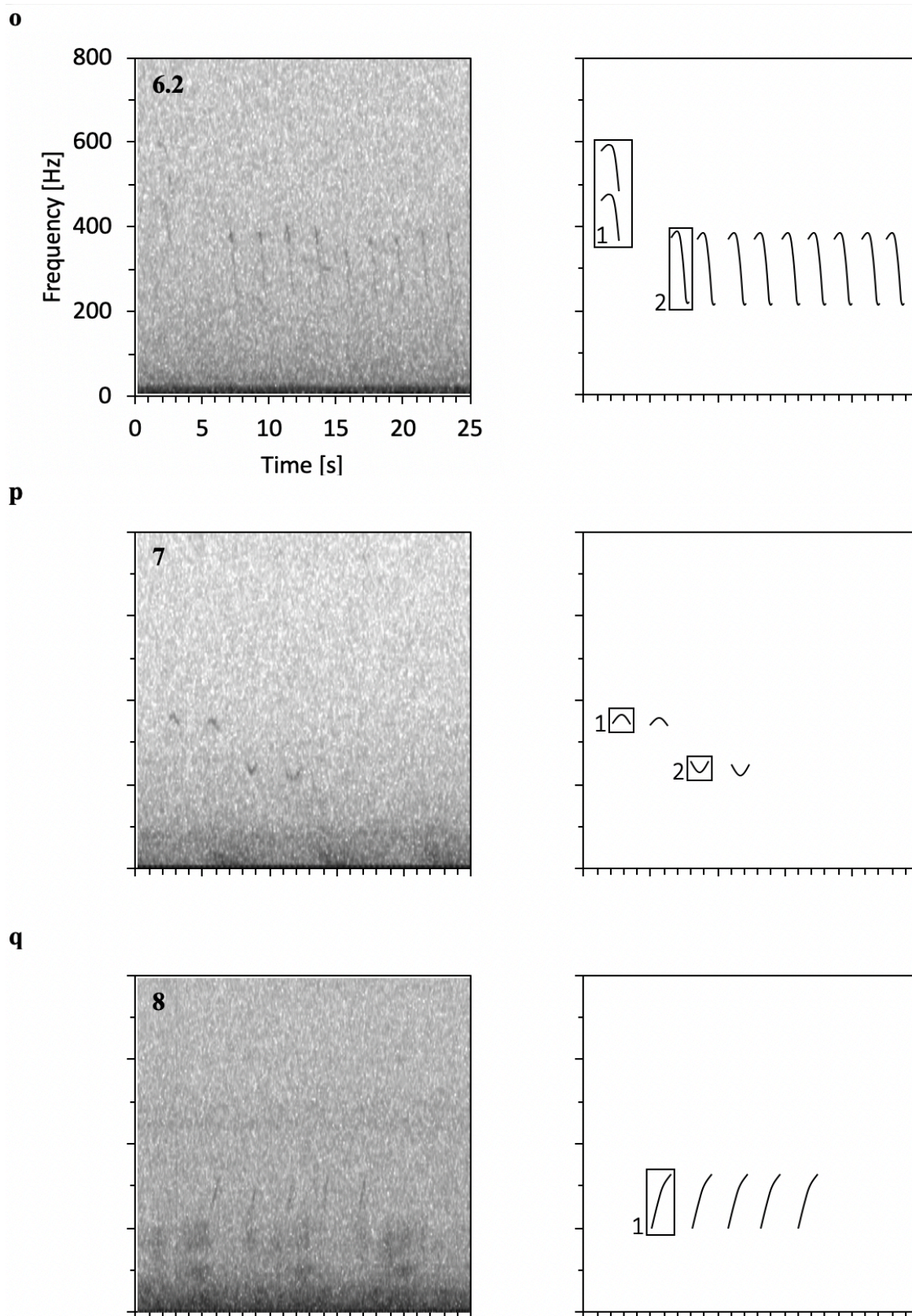


Figure A 2, continued.