

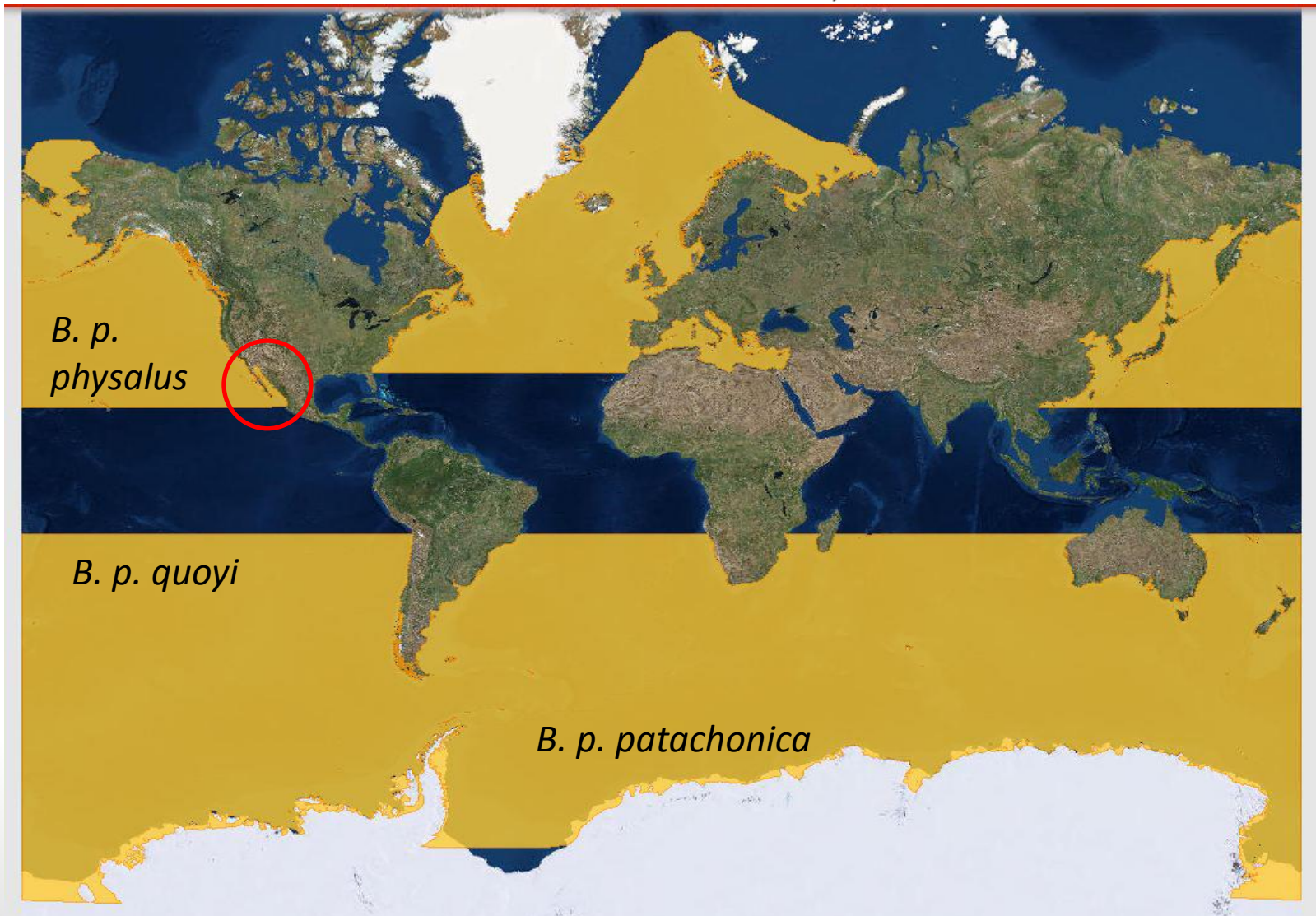


Variations of fin whale's 20 Hz calls in the Gulf of California

Andrea Bonilla-Garzón, Eduardo Romero Vivas and Jorge
Urbán-Ramírez

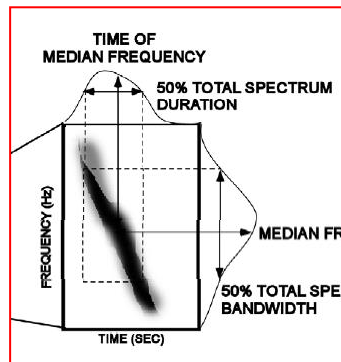


INTRODUCTION



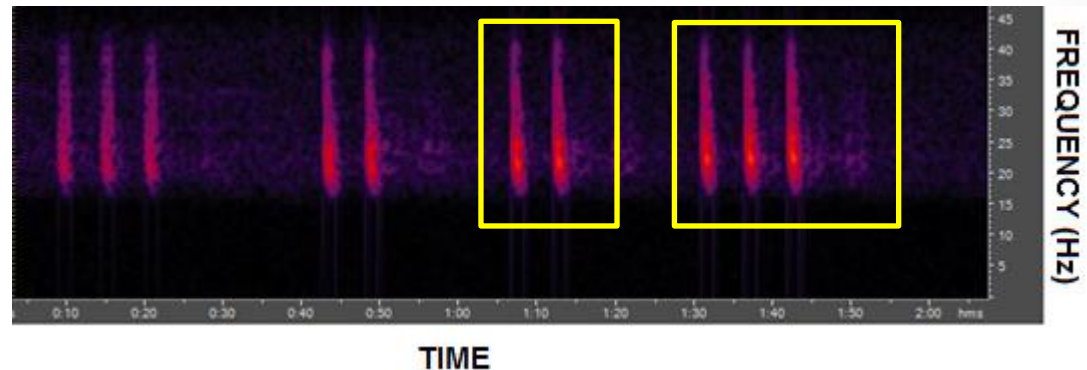
FIN WHALE'S CALLS

- Based on spectrograms

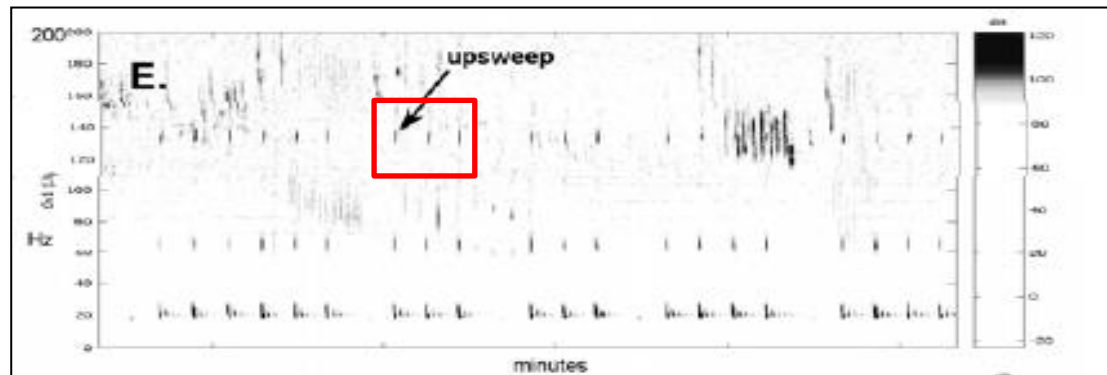
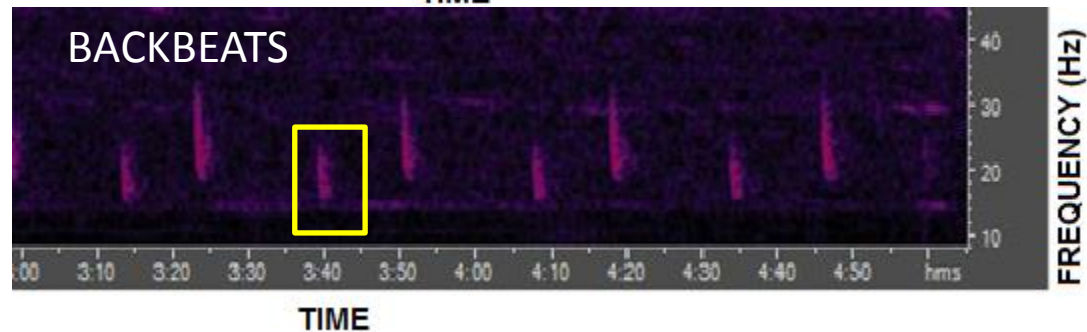


- TRAINS- BOUTS
- AGRUPATIONS
- REST/GAPS

REGULAR



BACKBEATS

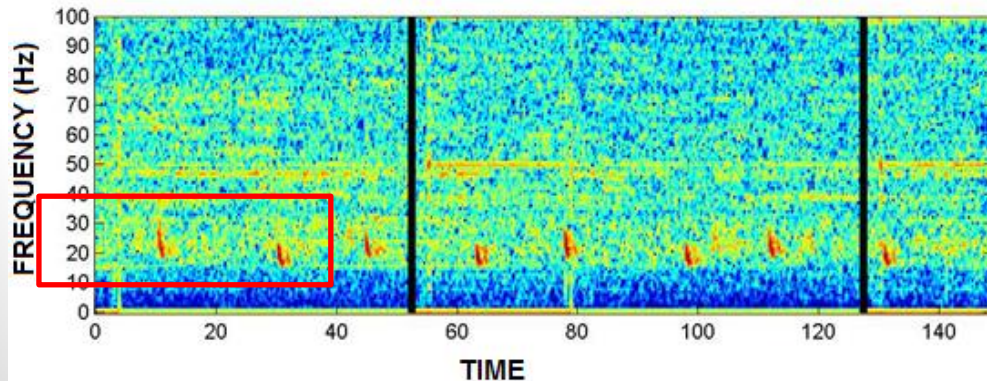
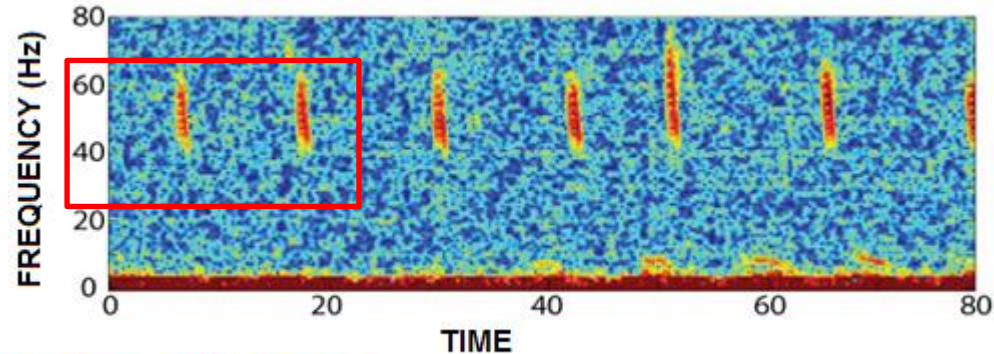
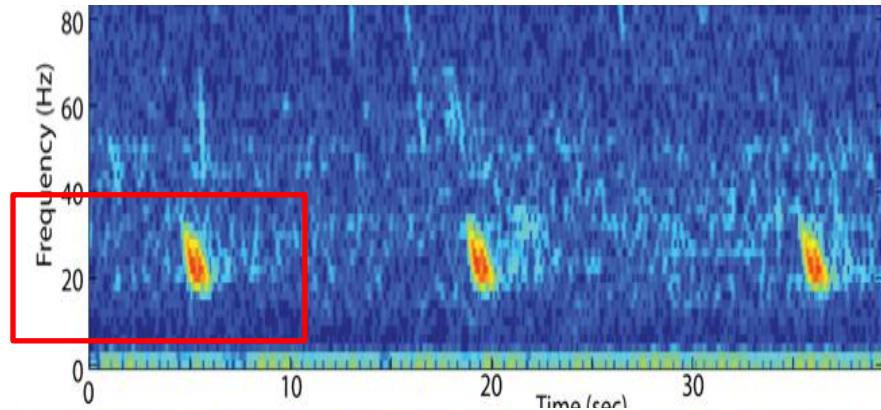


Related with behaviour

- Reproductive calls:

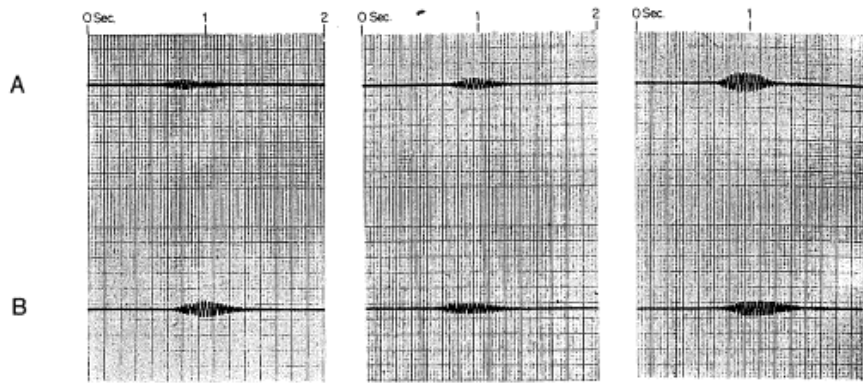
Only males

- Social calls:
- Dive, feeding
- navigation groups

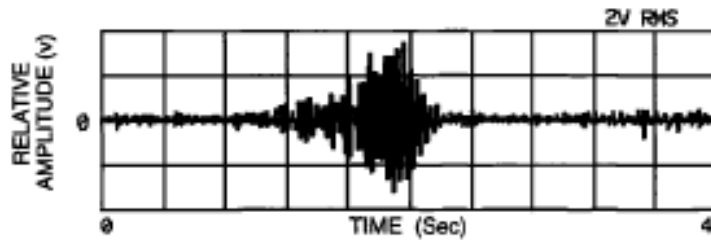


Waveform

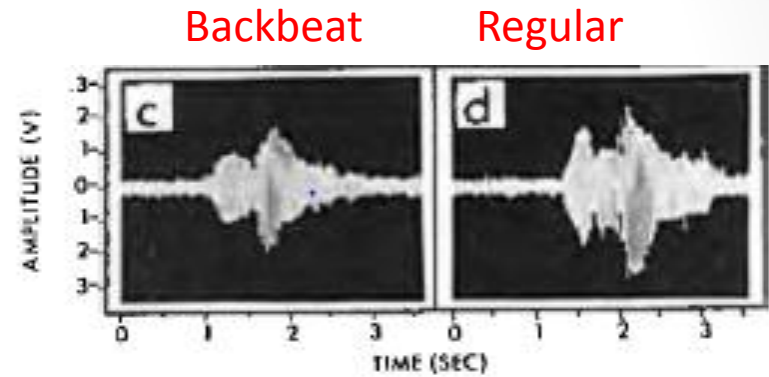
- Historically, few studies described the waveform



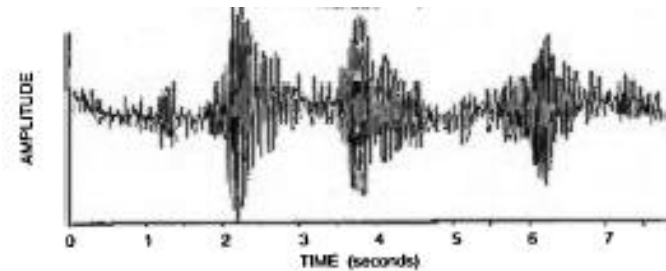
Watkins, 1981



Thompson *et al.*, 1992

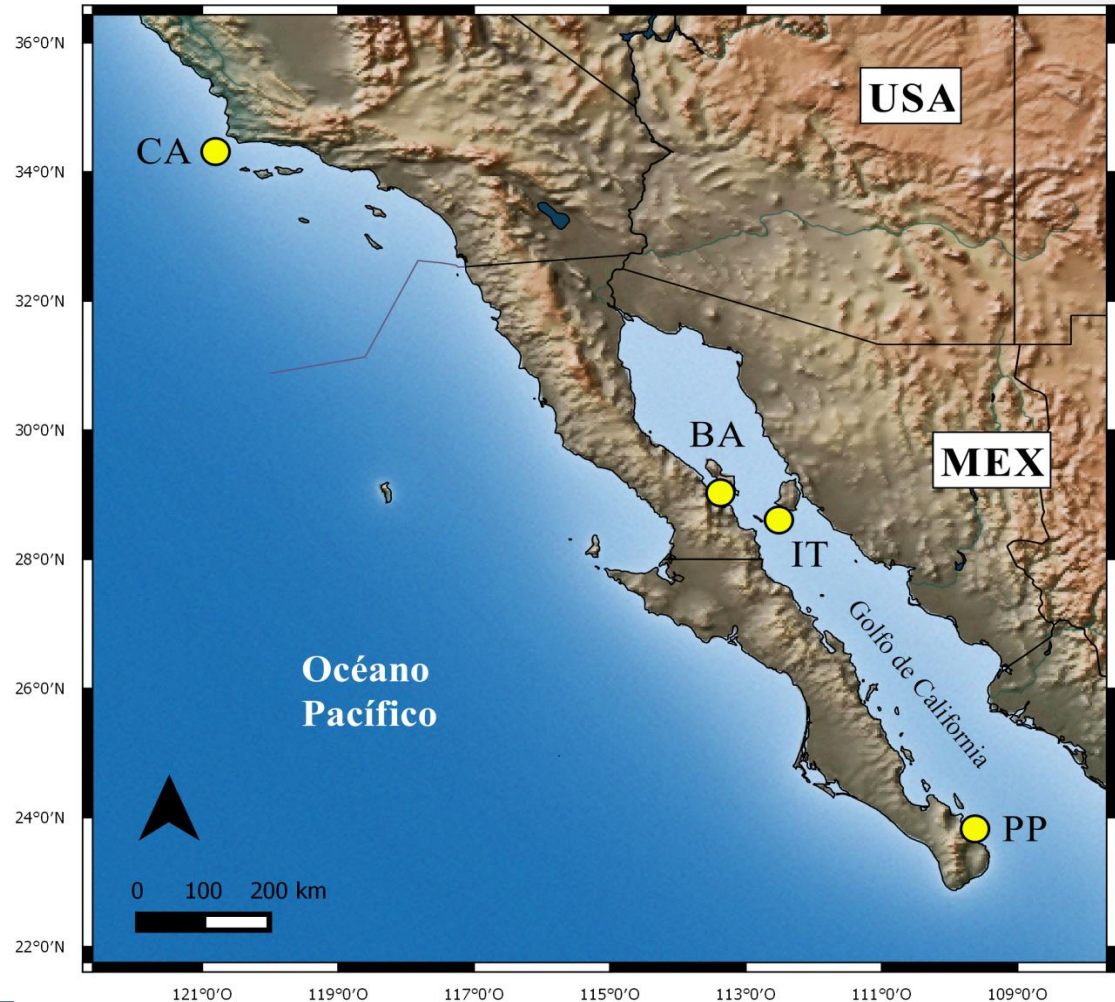
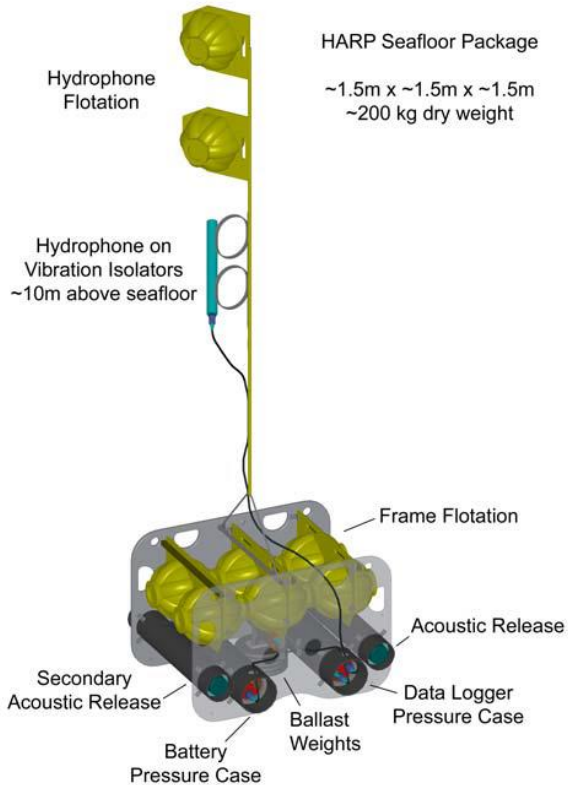


Northrop *et al.*, 1968 Type I & II



McDonald *et al.*, 1995

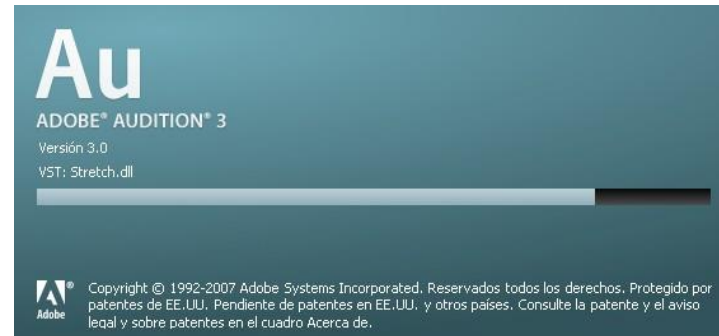
MATERIALS & METHODS



(5/15 min)
2004-2009

Materials & Methods

- Visual examining .LTSA files



- 30 sequences per locality

Not the same day

High signal- to-noise ratio

Of the high abundance months

- Each sequency (10 pulses)

Filter pass-band (17-42 Hz)

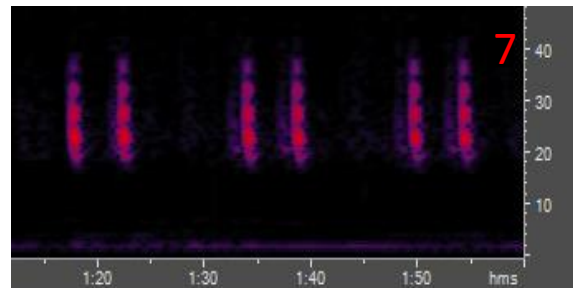
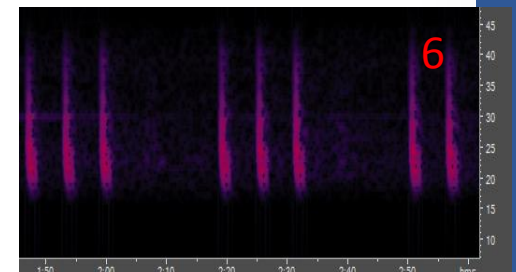
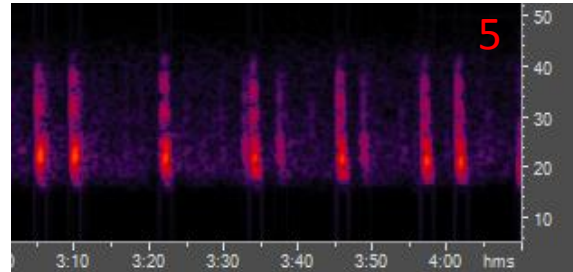
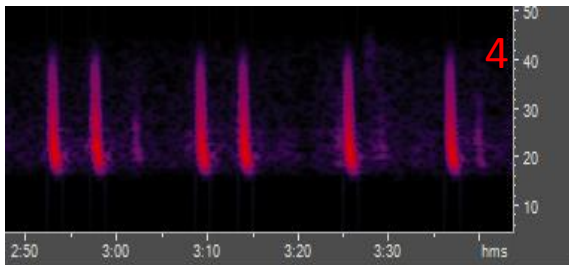
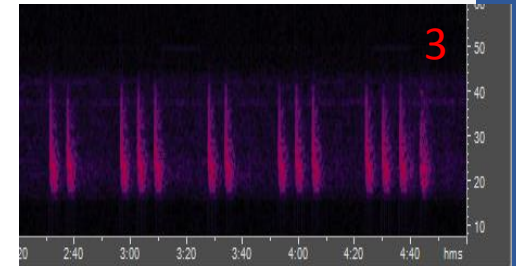
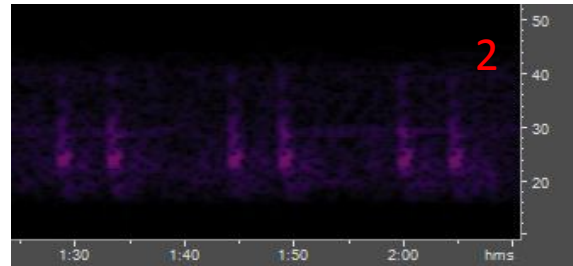
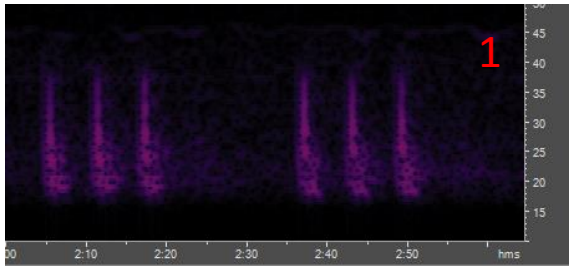
Normalization (0dB)

- *Waveform* option

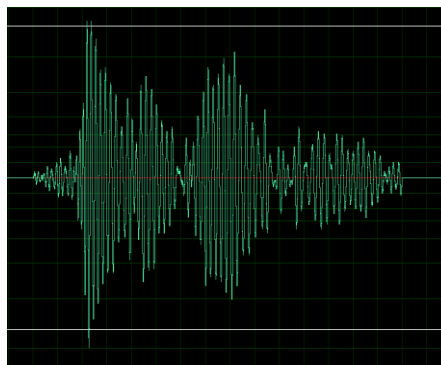
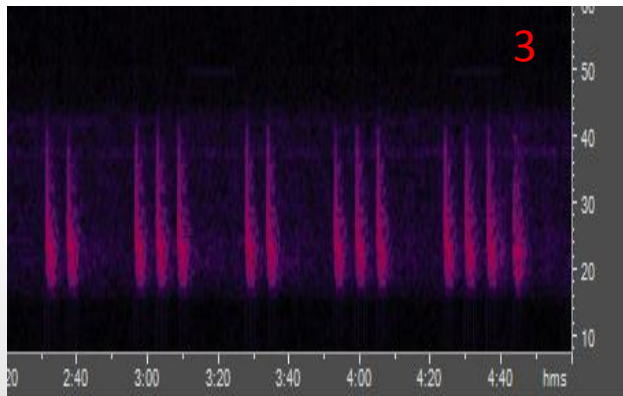
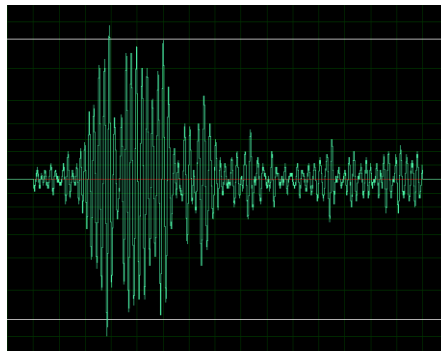
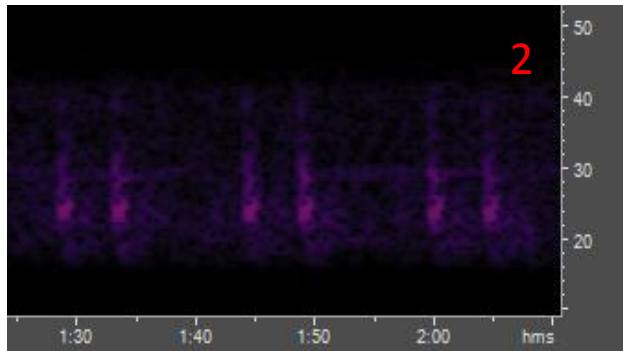
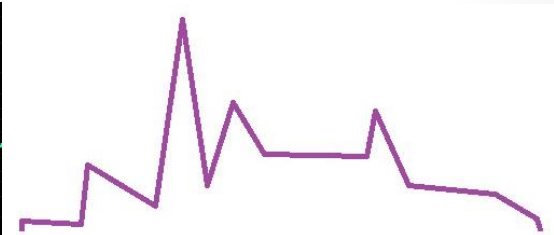
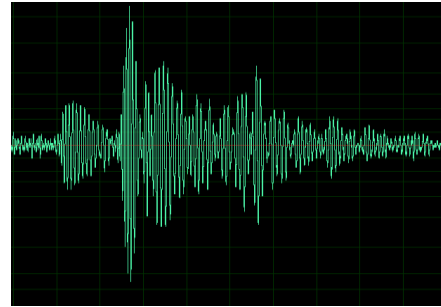
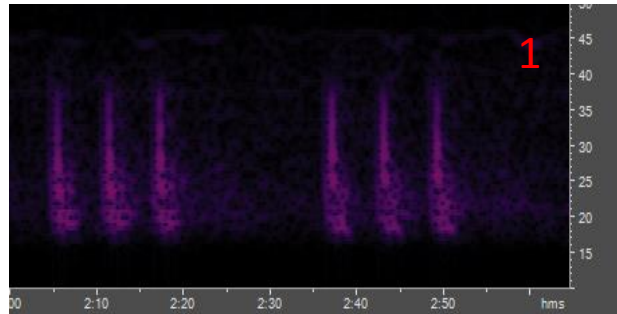
- ADSR description (Attack, Decay, sustain, Release)

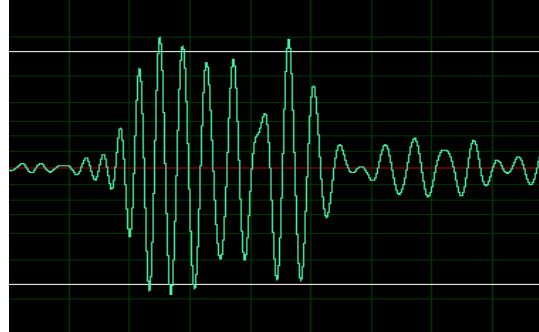
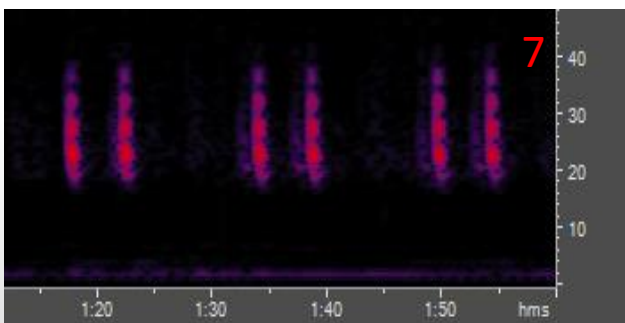
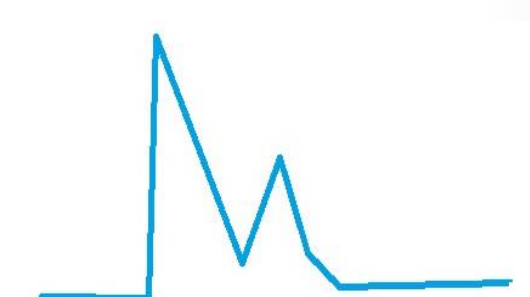
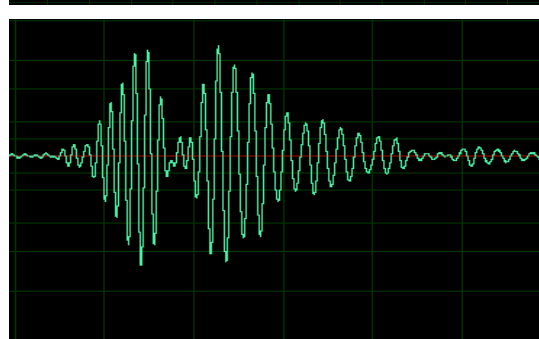
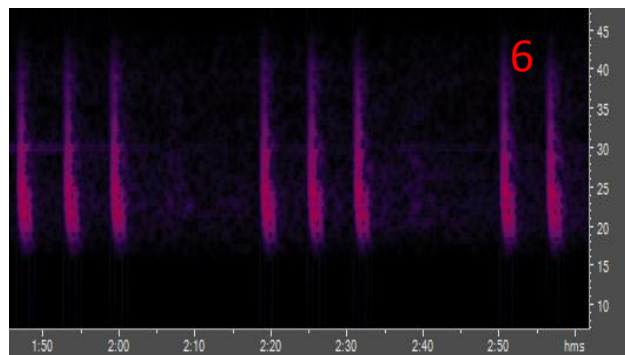
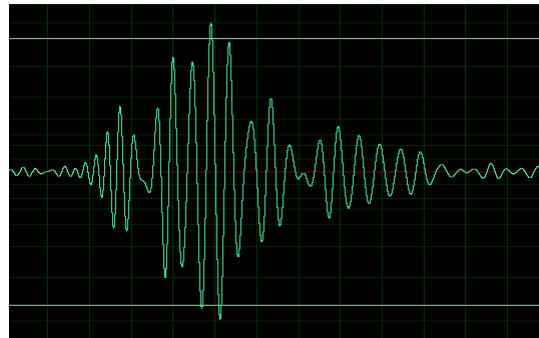
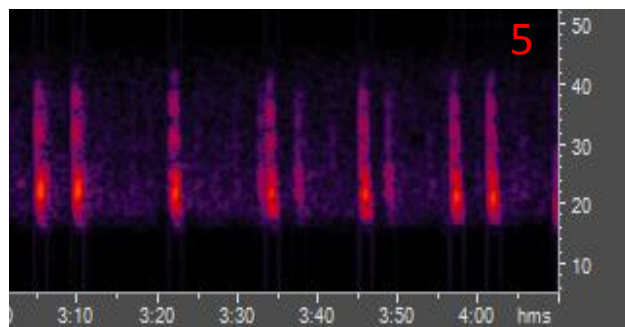
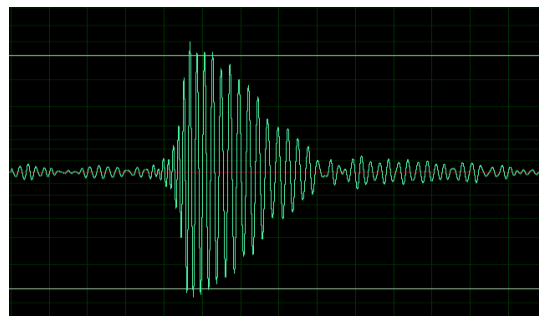
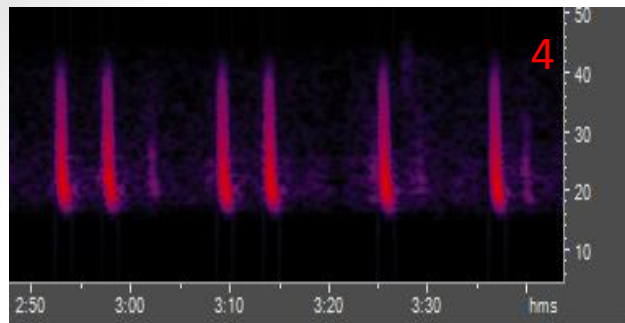
RESULTS

- If you compare the spectrograms, you can think all are look like the same



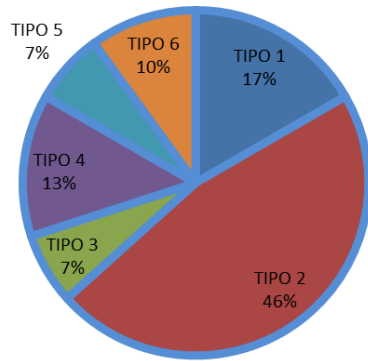
- however, we found 7 different types of calls, based on waveform



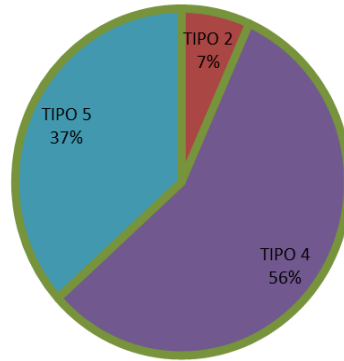


These are distributed in the GC

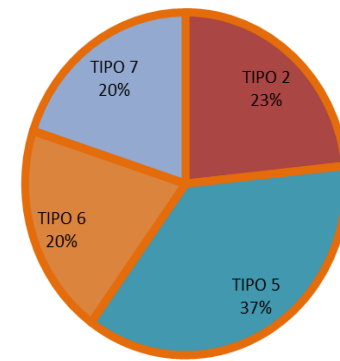
PUNTA PESCADERO



BAHÍA DE LOS ÁNGELES

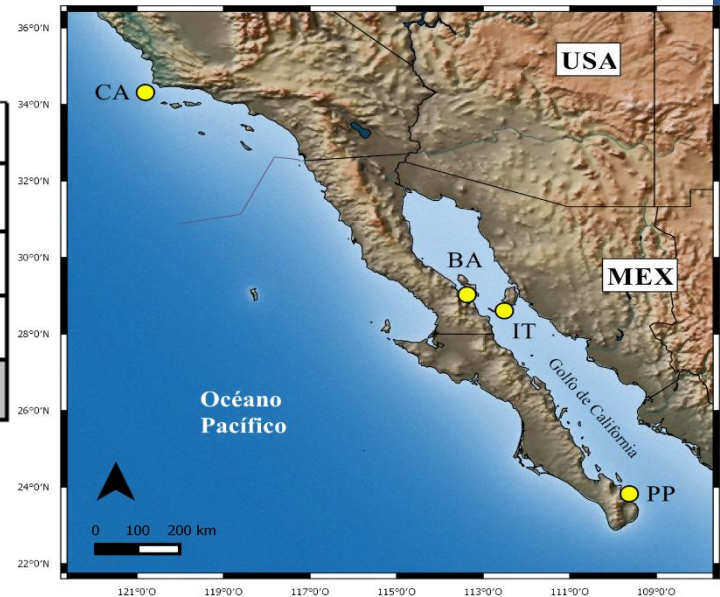


ISLA TIBURÓN



PRESENCE (%)

LOCATION	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7
PP	100	60.9	100	19.05	8.33	33.33	0
BA	0	8.7	0	80.95	45.83	0	0
IT	0	30.4	0	0	45.83	66.67	100



CONCLUSION

- The waveform analysis is a little used tool now, but it permits to know whit more details, if a species use a different types of calls in one o more ways, transmitting different messages in different contexts.
- Researches aim to understand what circumstances lead to modulation changes in reproductive calls in *B. physalus* are necessary.
- Simultaneous recording is necessary to know if the amplitude changes are not due to seasonal changes.

ACKNOWLEDGEMENTS

- Jhon A. Hildebrand.

