Supplementary Material

Negotiation of territory boundaries in a songbird

Figures S1 through S5 and Table S1 referenced in the main text are shown here.

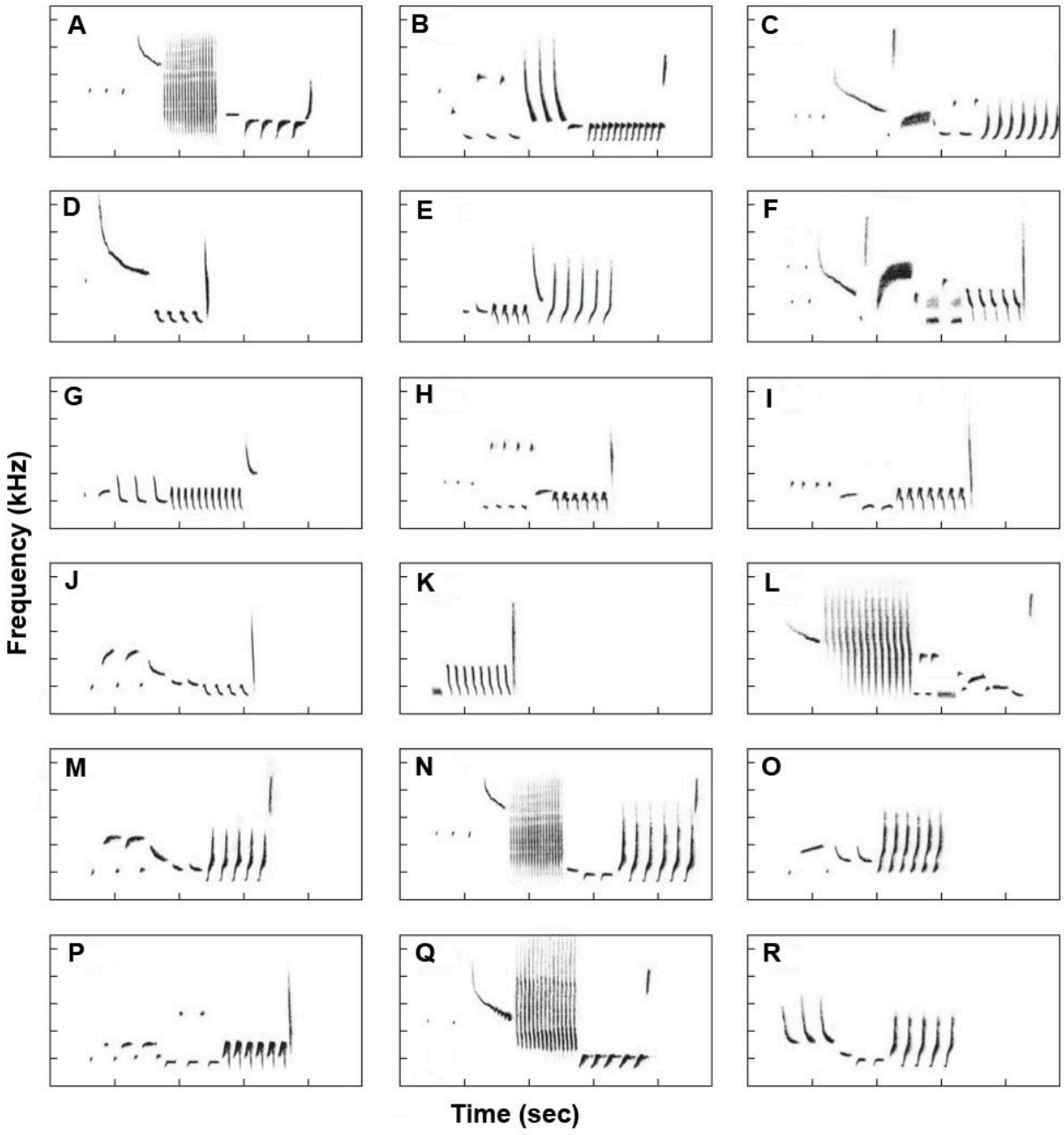

Figure S1. Partial repertoire of a banded wren male. Song types with a rattle: A, L, N and Q. Song types with a buzz: C and F. Song types with J-note trills: C, E, M, N, O and R. Song type P is often given in the presence of the female mate.

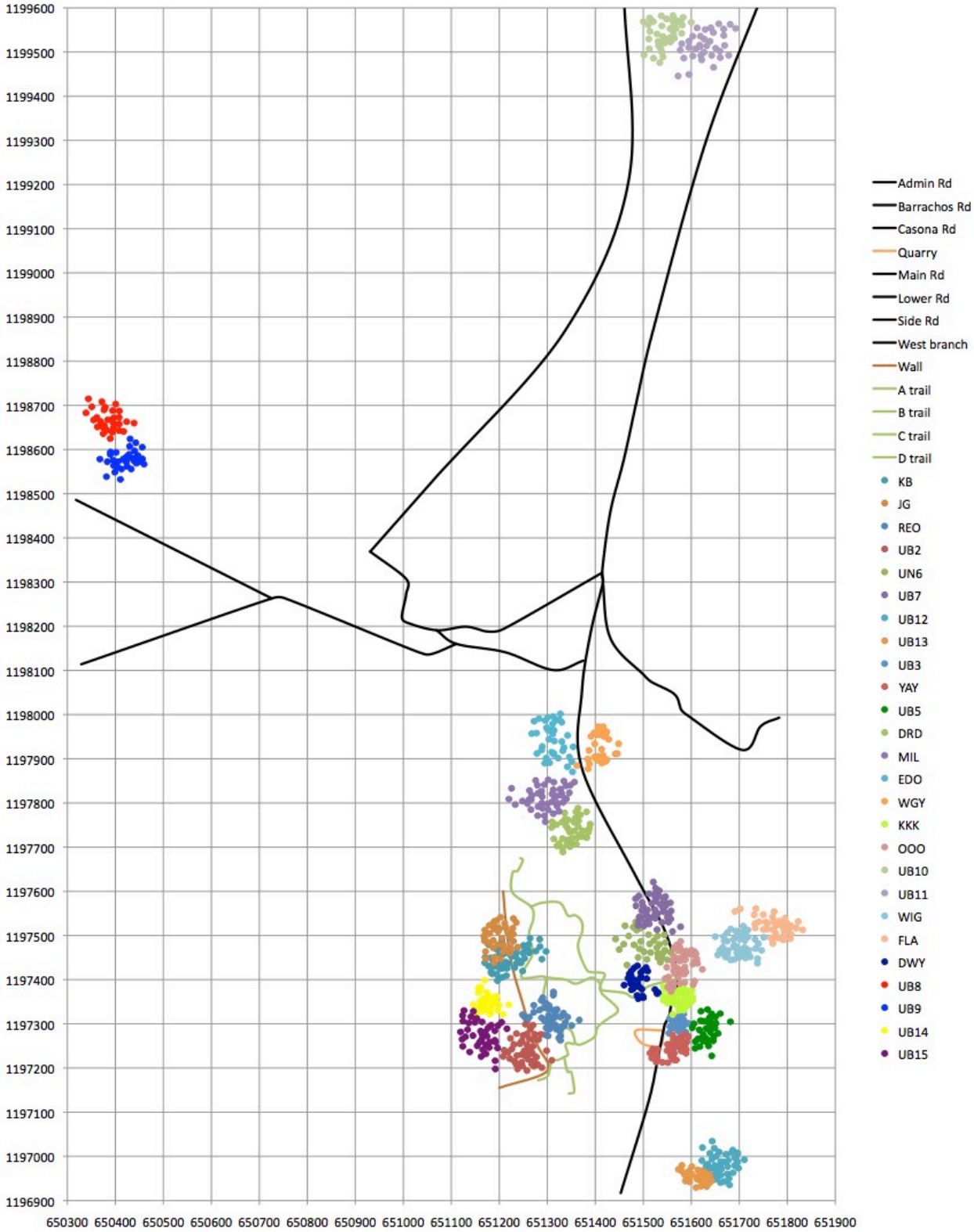

Figure S2 (above). Map of study area, showing major roads in the administrative area of Parque Nationál Santa Rosa in black, trails in green, and all flag locations for the 26 study males. Units are latitude and longitude in UTM units, grid squares are 100 by 100 meters.

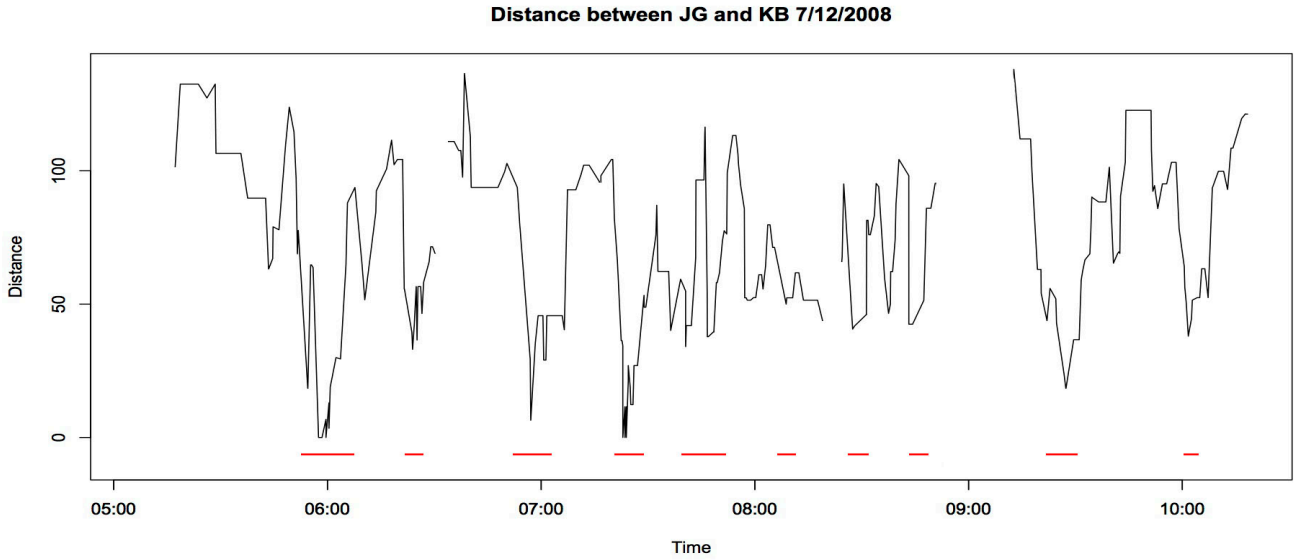

Figure S3. Example plot of distance between males for one day of recording. Red lines demarcate the during period of identified interactions, two of which involved a fight. Times with no distance line occur when the location of one bird is unknown or when observers took a break.

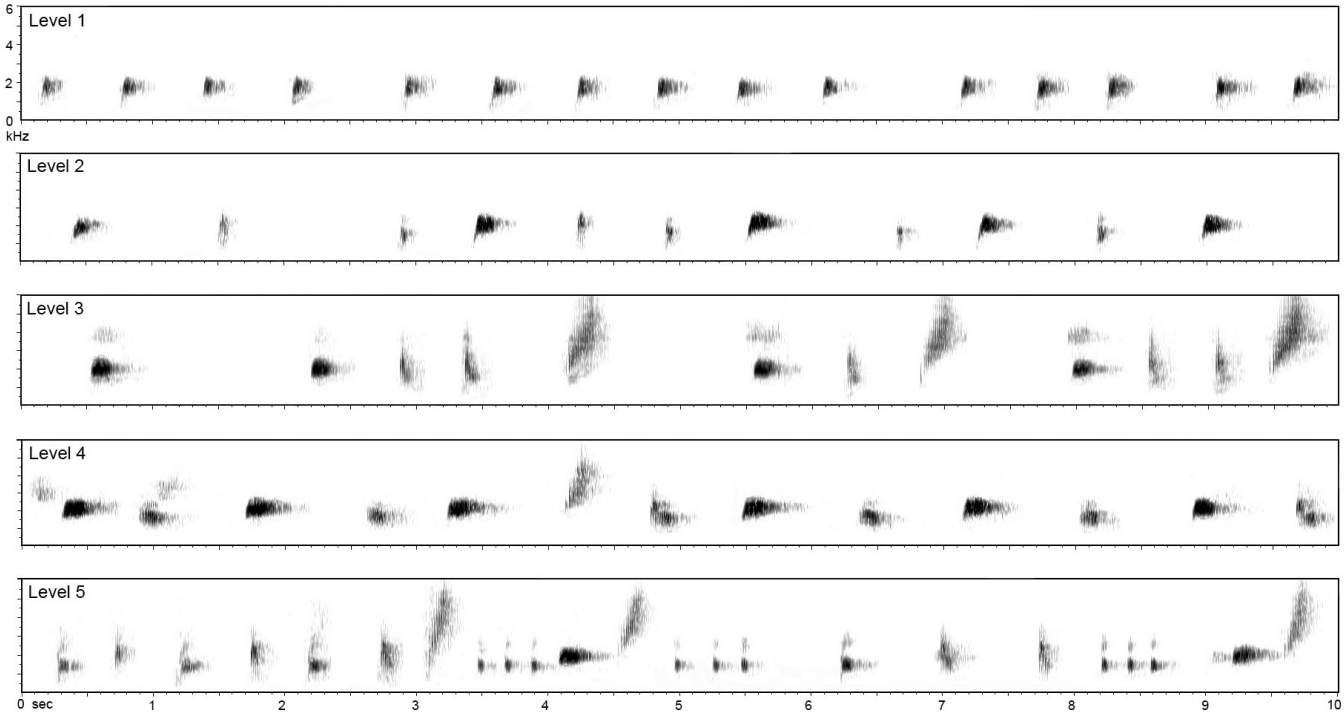

Figure S4. Examples of grunting intensity levels. The primary criterion for our designation of level was the number of different note types: 1 note for level 1, 2 for level 2, etc. Higher intensity grunt bouts tended to contain the higher frequency buzz notes that are similar to those incorporated into some song types. Spectrograms were band-pass filtered and cleaned of non-wren sounds for clarity. Spectrogram settings: FFT size = 512, frequency resolution 93.8 Hz, time resolution 3.13 ms, Hann window.

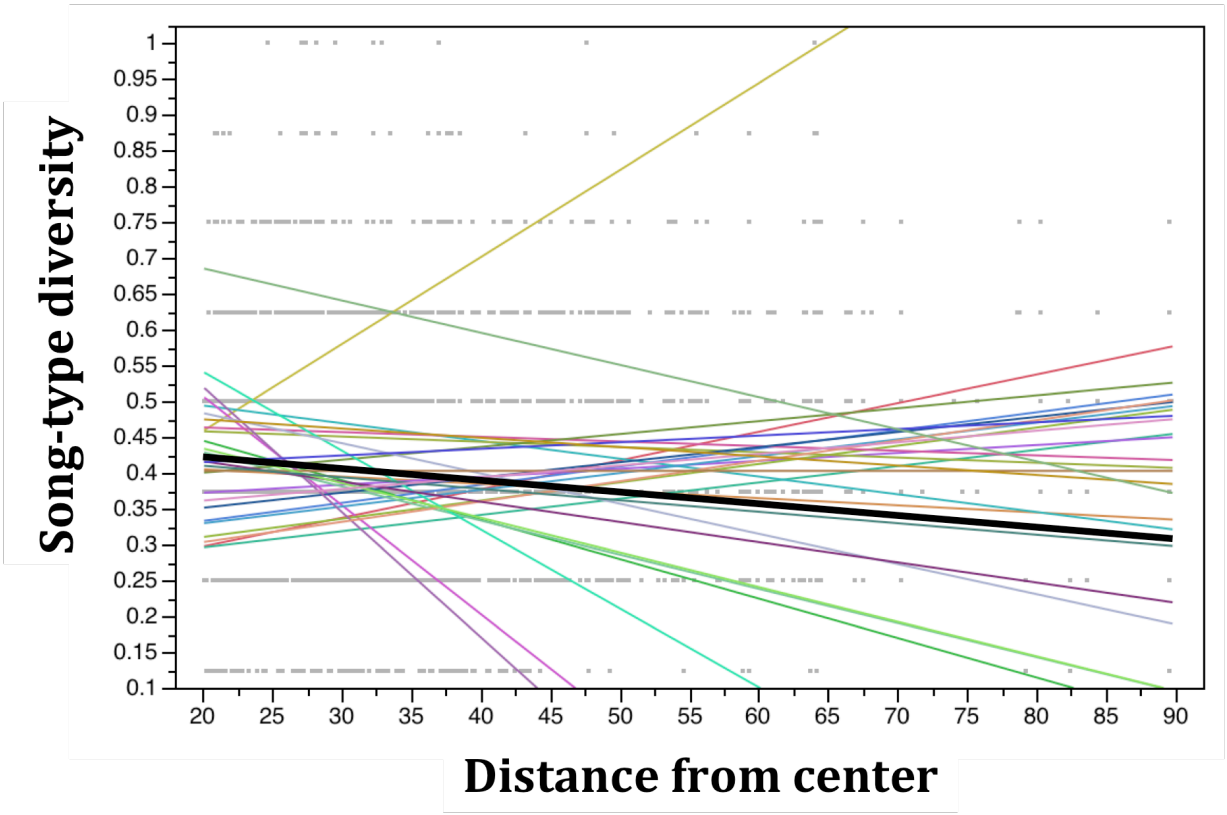

Figure S5. Graph of song-type diversity as a function of distance of the male from the center of his territory (meters). Colored lines show slope estimates for individual males based on results generated by the ANCOVA analysis; heavy black line shows overall mean slope.

Table S1. Dyad and bird statistics, including inclusive dates recorded (mm/dd), territory overlap, number of interactions, maximum escalation level, song-type sharing index, birdID, repertoire size, fraction rattle-buzz song types, fraction of times male was the instigator, general aggressive status (aggressor or defender), breeding stage, the song-type diversity versus distance slope, and territory size (maximum length in m).

Pair	Dates	Terr Ovrlp	Inter-actns	Max esc	Share index	Bird	Rep size	% rat-buzz	% instig	Sta-tus	Br stage	Slope	Terr size
1	05/20-05/21	Gap	4	C	0.769	DWY	19	0.421	0.75	A	C	-0.004	74.8
						OOO	20	0.4	0.25	D	I	-0.0137	91.6
2	05/23-05/27	Abut	14	G	0.851	EDO	22	0.455	0.75	A	C	0.004	139.4
						WGY	25	0.56	0.25	D	C	0.0024	103.9
3	05/31-06/03	Abut	19	G	0.863	REO	24	0.375	0.118	D	I	0.0038	119
						UB2	27	0.333	0.882	A	C	0.0033	105.1
4	06/05-06/07	Over-lap	22	F	0.818	UB3	22	0.364	0.591	A	C	-0.0095	55.9
						YAY	22	0.409	0.409	D	I	0.0002	77.6
5	06/10-06/12	Gap	10	G	0.894	UB5	24	0.417	0.556	A	C	-0.0027	103.5
						YAY	23	0.391	0.444	D	C	-0.0045	79.6
6	06/17-06/19	Over-lap	22	F	0.878	UB6	20	0.5	0.318	D	C	-0.0013	118.8
						UB7	21	0.476	0.682	A	C	0.0015	119.2
7	06/21-06/24	Gap	10	G	0.683	UB8	18	0.333	0.778	A	C	-0.0033	109.7
						UB9	23	0.391	0.222	D	N	-0.0001	98.9
8	06/26-06/28	Gap	17	G	0.875	UB10	22	0.409	0.25	D	N	0.0008	110.1
						UB11	26	0.423	0.75	A	I	0.0008	161.3
9	07/01-07/03	Over-lap	22	F	0.900	UB12	19	0.474	0.591	D	C	-0.0033	105.6
						UB13	21	0.429	0.409	A	C	0.0036	73.7
10	07/04-07/06	Over-lap	26	F	0.667	UB14	17	0.529	0.083	D	I	-0.016	83.8
						UB15	28	0.5	0.917	A	I	0.0043	147.5
11	07/11-07/13	Over-lap	19	F	0.857	JG	21	0.476	0.842	A	C	0.0038	114.9
						KB	21	0.476	0.158	D	I	0.0026	125.9
12	07/16-07/19	Abut	9	G	0.684	FLA	18	0.556	0.333	D	I	0.0005	146.8
						WIG	20	0.4	0.667	A	C	0.0031	106.8
13	07/20-07/22	Abut	12	G	0.703	DRD	16	0.5	0.818	A	N	0.0055	103.6
						MIL	21	0.476	0.182	D	C	-0.001	141.9
14	07/25-07/27	Over-lap	8	F	0.64	KKK	19	0.474	0.875	A	C	0.0136	85.2
						OOO	22	0.409	0.125	D	N	0.004	114.9