Table S1. Duration for all 55 REMS-like iterations and QS intervals in minutes including the date and time of day (to the nearest hour) the sleep-like bout occurred for each cuttlefish. Sleep-like bouts are in separate columns.

| Date	Jul-25	Aug-02	Jul-29	Aug-10		Aug-14	Aug-16		Aug-26	Aug-28
Time	8am	3am	10am	8am	2pm	6pm	5am	11am	6am	10am
Cuttlefish ID	Hippo	Hippo	zZ	MrChips	MrChips	Medusa	Medusa	Medusa	Dumbo	Clyde
REMS-like iteration (minutes)	2.37	1.55	1.30	1.43	3.18	1.93	2.37	2.68	1.67	1.45
QS interval (minutes)	39.47	29.43	82.90	52.50	29.05	NA	48.00	30.90	32.27	56.08
REMS-like	2.72	2.18	1.30	2.15	3.08		2.40	2.60	2.25	2.32
QS	34.83	30.30	30.12	29.27			35.95	33.78	30.85	36.53
REMS-like	3.18	2.65	2.25	2.37			2.30	2.70	2.58	2.50
QS	34.90	30.40	29.67	28.33			30.65		32.02	50.03
REMS-like	2.63	2.90	1.97	2.97			3.17		2.60	1.37
QS	35.87	29.38	26.43				32.62		31.18	
REMS-like	2.37	2.92	1.98				2.85		2.82	
QS	33.03	29.10	34.27				31.62		29.37	
REMS-like	3.13	2.67	2.78				2.62		2.63	
QS		27.73	27.23				30.07		31.53	
REMS-like		2.83	2.45				3.08		2.77	
QS		30.18	27.53						29.85	
REMS-like		2.93	1.60						2.62	
QS		26.00	28.43						36.37	
REMS-like		2.38	1.62						3.13	
QS			24.47							
REMS-like			2.30							

A.

B.
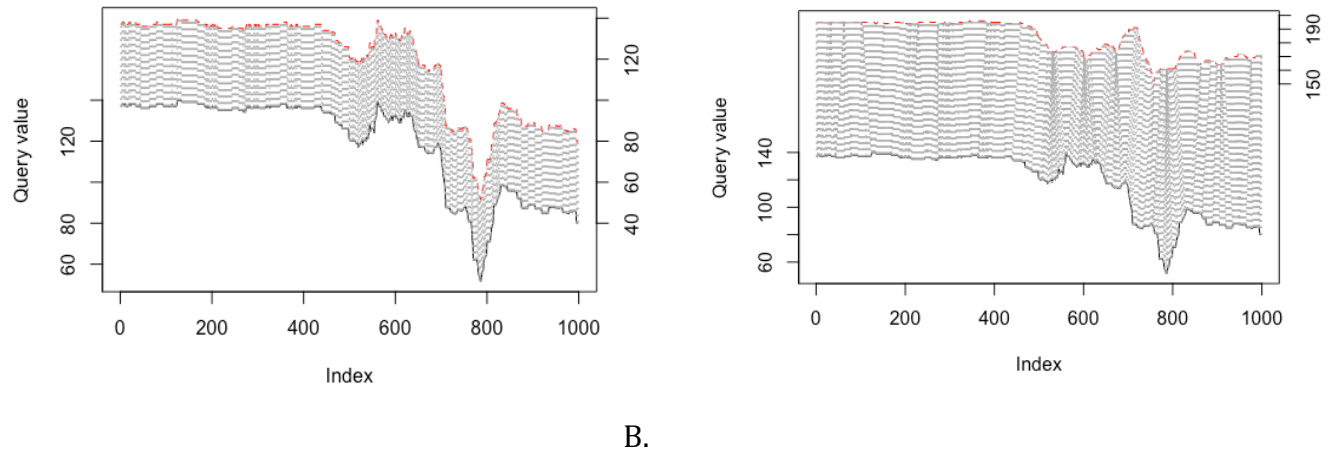
Figure S1. Graphic representation of two signals aligned to calculate signal distance using Dynamic Time Warp (*dtw*). The y-axis indicates pixel intensity; however, to visualize the signal matching, spacing is introduced along the y-axis. The x-axis denotes the video frame from a video recording at 30 frames per second. A) Compares a signal to itself. The difference measure returned is 0. B) Aligns two different signals by stretching and compressing to find a best match between the sequences. The difference measure returned is 122887.1.
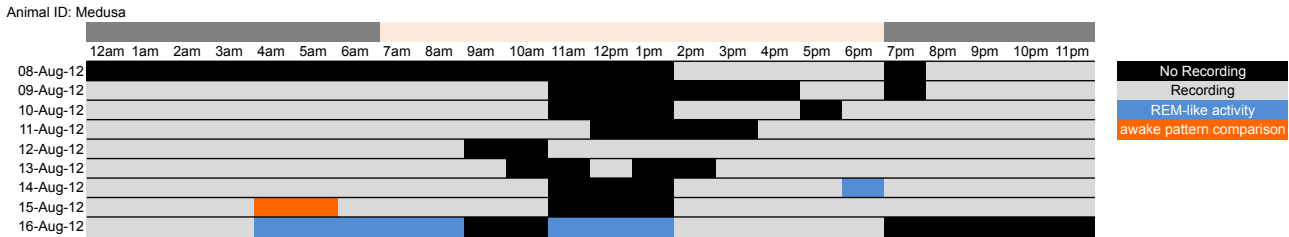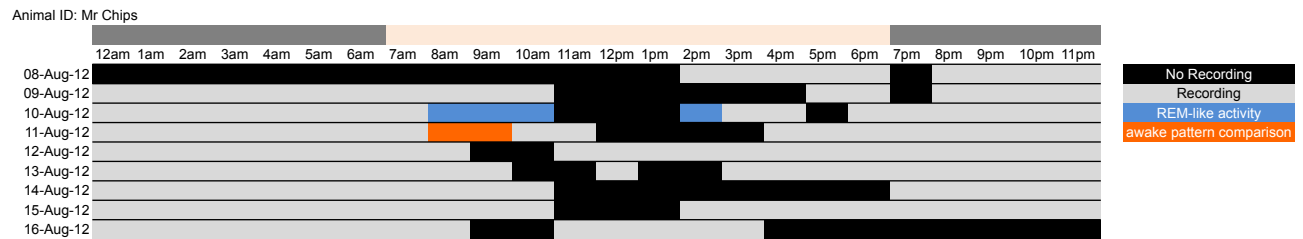
A.

Animal ID: Hippo

B.

Animal ID: zZ

C.

Animal ID: Medusa
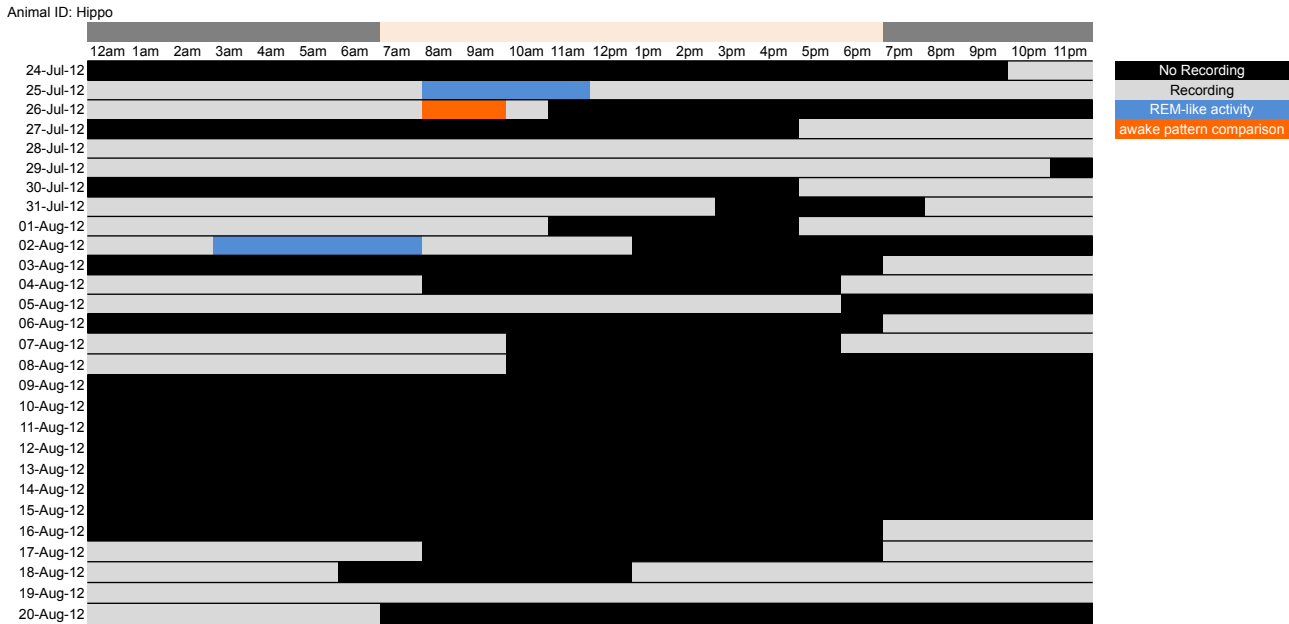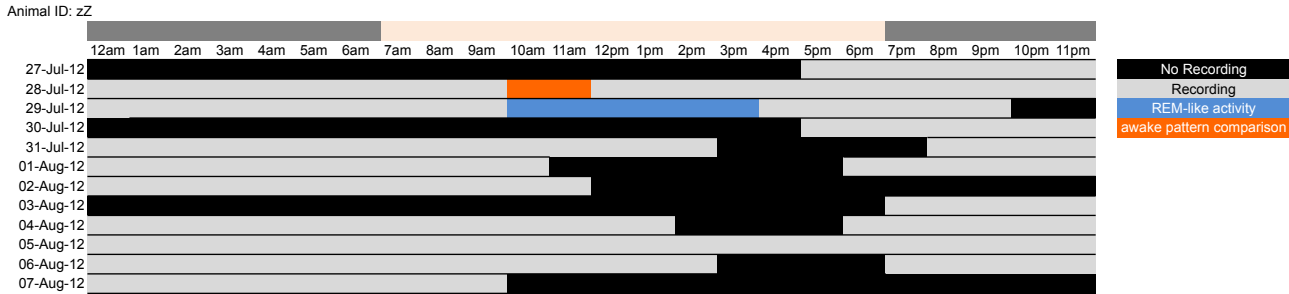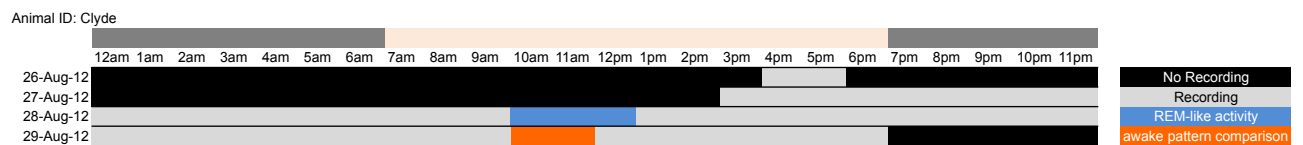
D.

E.

F.

Figure S2. Timetable of all animals indicating when they were video recorded (gray) and when a sleep-like bout with REMS-like activity was observed (blue). Black areas indicate intentional breaks in the recording or where video was lost due to technical issues with the hardware. Orange areas indicate where footage of animals in the awake state were used for pattern change counts, however, footage of animals following a sleep-like bout were also used when possible. A) Hippo, B) zZ, C) Medusa (August 14 at 6pm REM-like activity was interrupted by adding food to the tank), D) Mr Chips, E) Dumbo, and F) Clyde.

Rates of body pattern changes in three different states

animal ID	state	# changes	# minutes	changes/minute
clyde	awake	10	10.07	0.99
clyde	awake	10	18.08	0.55
clyde	awake	5	12.85	0.39
clyde	qs	15	15.90	0.94
clyde	qs	81	20.87	3.88
clyde	rem	71	1.67	42.60
clyde	rem	88	2.23	39.40
clyde	rem	98	2.68	36.52
mrchips	awake	18	21.20	0.85
mrchips	awake	18	20.00	0.90
mrchips	qs	10	14.10	0.71
mrchips	qs	7	10.40	0.67
mrchips	qs	6	17.25	0.35
mrchips	rem	86	1.80	47.78
mrchips	rem	131	2.82	46.51
mrchips	rem	194	2.95	65.76
mrchips	rem	207	3.33	62.10
dumbo	awake	16	40.63	0.39
dumbo	qs	8	9.58	0.83
dumbo	qs	20	24.82	0.81
dumbo	qs	11	11.57	0.95
dumbo	rem	97	1.57	61.91
dumbo	rem	145	3.02	48.07
dumbo	rem	187	3.05	61.31
dumbo	rem	184	3.18	57.80

Table S2. Raw count data used in AICc model selection analysis of body pattern changes in each video clip for each state: awake, QS, REMS-like for three animals. Ranges of rates given in the main text originate from this dataset.

MrCHIPS
REMS-like
86 changes in first clip
131 in next clip
194 in next clip
207 in last clip
OVERALL: 618

QS
10 changes in clip QS1 -only one pattern was "full"
7 changes in clip QS2 -all changes very subtle - no "full" pattern
6 changes in clip QS3-all changes very subtle - no "full" patterns
OVERALL: 23

AWAKE
18 changes in first clip -Note: fin fluttering constantly in between patterns
18 changes in next clip all camouflage, very subtle, all same pattern (not as jumpy as first clip)
OVERALL: 36
=============================
DUMBO
REMS-like
97 changes in first clip
145 in next clip
187 in next clip
184 in last clip
OVERALL: 613

QS
8 changes in clip QS1 -very subtle tiny changes - amazingly stable overall
20 changes in clip QS2 -again, very subtle changes -just a faint overall blush hardly noticeable; nearly all pale w just a few small dark spots
11 changes in clip QS3
OVERALL: 39

AWAKE
16 changes in clip
OVERALL: 16
=============================
CLYDE
REMS-like
71 changes in first clip
88 in next clip
98 in next clip
OVERALL: 257

QS
15 changes in clip QS1 -only 1 overall pattern change … all the others are very tiny blushes of components
81 changes in clip QS2 -many more changes than other QS clips
OVERALL: 96

AWAKE
10 minor changes in first clip -changes were very subtle
10 minor changes in next clip
5 minor changes in next clip
OVERALL: 25

NOTES for Table S2. Observational notes regarding body pattern changes in three animals in three different states (awake, quiescent sleep-like (QS), and rapid eye movement sleep-like (REMS-like) states). (notes by RTH, edited by TLI)
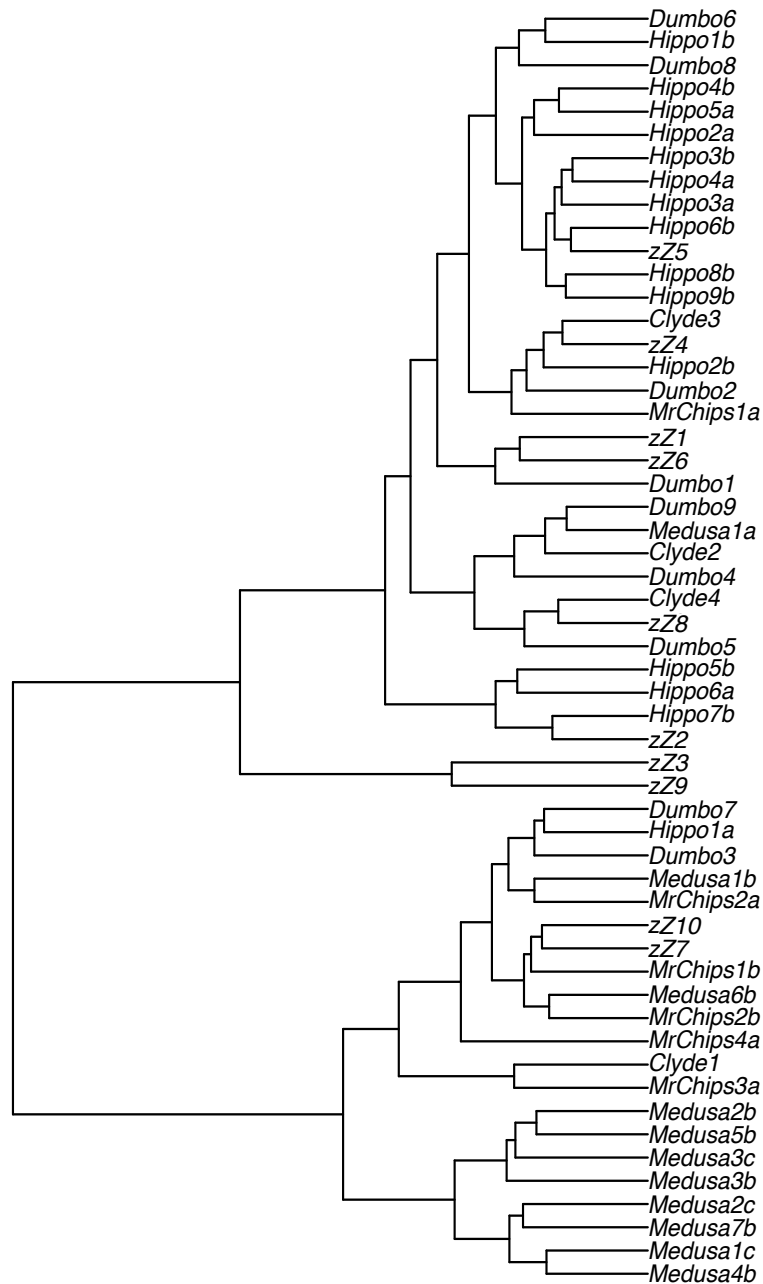
Figure S3. Cluster dendrogram, indicating similarity between all REMS-like iterations using data from mantle region. Tip labels indicate the animal (Hippo, zZ, MrChips, Medusa, Dumbo, and Clyde) and REMS-like iteration within a sleep-like bout (1=1st, 2=2nd …10= 10th). Letters following the number indicate the sleep-like bout (a= 1st bout, b=2nd bout, c=3rd bout).
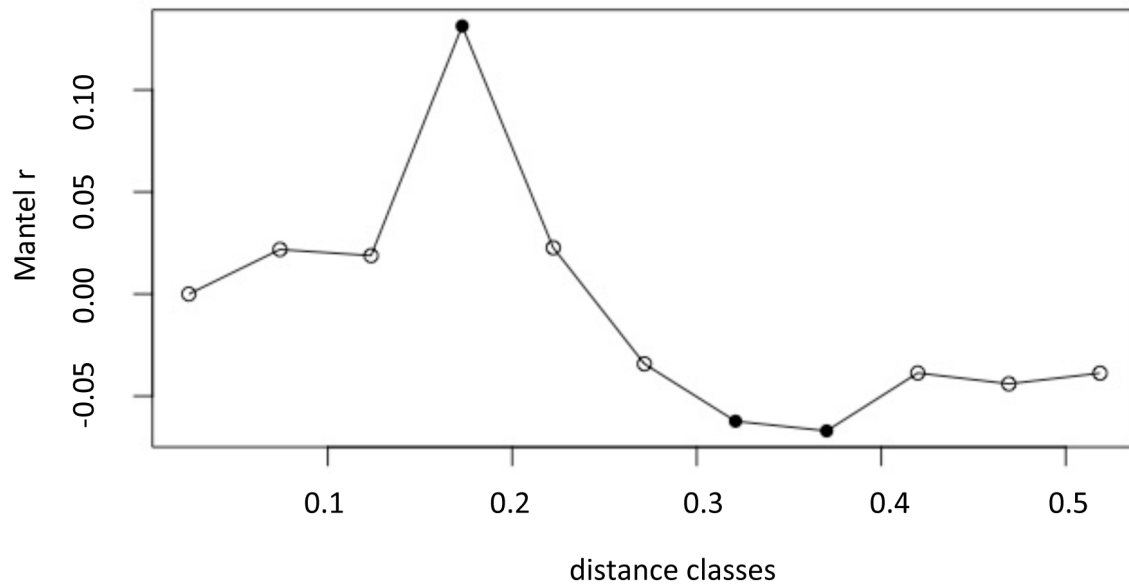
Figure S4. Mantel correlogram demonstrating the correlations between an individual animal and the pixel sequence distance matrix for all REMS-like iterations. Dark circles indicate $p < 0.05$ significance. The points of significance indicate that REMS-like state sequences with higher similarity (larger Mantel r) originate from the same animal and sequences more dissimilar to each other originate from different animals. This relationship (Mantel r) is not very strong, however.

Movies of animals in the REMS-like state

Movie 1. Hippo 1a (close up of eye and clear view of skin texture changes)

Movie 2. Clyde 4 (1st pair arms raised during QS state; relax at start of REMS-like state)

Movie 3. Hippo 2b (pupils expand during the REM-like state)

Movie 4. Medusa 1a (eye movement and skin texture changes)

Movie 5. MrChips 1b (full arm movement, raising 1st pair)

Movie 6. (top view of 5 different REMS-like iterations for all individuals in study)