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SUBJECT: Data report #3 for green turtle remote tracking stations in San Diego Bay

The following is the third report on green sea turtle tracking efforts in San Diego Bay by the U.S. National Marine Fisheries Service. The activities summarized herein occurred from August 2007 to January 2008. A total of 8 ultrasonic transmitters were deployed on green turtles in San Diego Bay during this period, in addition to 15 previously deployed transmitters (Table 1). We recovered submersible ultrasonic receivers (SURs) deployed during Phase 2 of this study (See Report #2) and deployed new SURs at these and additional sites in the bay (Table 2). A total of fifteen SUR stations are currently installed throughout the Bay (Table 2, Figure 1b). The data included in this report should be cited as "Eguchi and Seminoff, unpublished data."

Acoustic telemetry

SUR Deployments

A total of five SUR stations were retrieved from the San Diego Bay north of the Coronado Bay Bridge on 16 November 2007 (Figure 1a). These SURs were replaced with SURs with new batteries, with the exception of SUR 00406, which was removed. SUR 00406 had been located near the Marine Corp Recruiting Depot and had not received any transmissions from deployed transmitters. All SUR stations north of the Coronado Bay Bridge were recovered.

Repeated rainstorms during December hampered efforts to retrieve the SUR stations located south of the Coronado Bay Bridge, but a break in the weather allowed us to resume efforts in January. Low visibility underwater created difficult conditions for retrieving receivers. We retrieved three SURs (00400, 00401, & 00402) that comprised the South Fence in the far southern portion of South Bay on 3 January 2008 (Figure 1a).

SUR 00402 had a defective wire within its circuitry and the SUR will be returned to the Sonotronics factory for repair and to have data retrieved.

The retrieval of SURs 00407, 00393, 00396, 00408, and 00391 occurred on 8 January 2007. Three SUR stations; 00394, 00405, and 00948 were missing (Figure 1a, Table 2). SUR 00394 was missing from site Red 18 on 8 January 2008 just north of the Chula Vista Marina. SUR 00394 was recovered during subsequent search efforts on 15 January 2008. SUR 00405 was missing from the point near the channel north of the South Bay Power Plant. SUR 00948 was missing from the channel south of the South Bay Power Plant. New units were deployed at these locations, and additional recovery efforts will be made.

Two “fences” have been created to document the movement of the turtles into defined areas of San Diego Bay. The northernmost fence, the North Fence detects movements of the turtles passing through a narrow section of the bay adjacent to the Coronado Ferry landing (see Figure 1b, SURs 00207 and 00215). Placement of the SURs within close proximity of each other across this narrow section of the Bay can detect movement of tagged turtles into and out of the southern section of the Bay. The “South Fence” was created in the southernmost section of San Diego Bay (see Figure 1b, SURs 00392, 00402, 00270, and 00206). The South Fence SURs can detect the presence of tagged turtles into the southernmost section of San Diego Bay.

Turtle Presence

Turtle-mounted transmitters were detected at six SUR stations in the South Bay including SUR 00393 (Figure 2a), SUR 00396 (Figure 2b), SUR 00400 (Figure 2c), SUR 00401 (Figure 2d), SUR 00407 (Figure 2e), and SUR 00408 (Figure 2f). During this phase the receiver in the channel south of the power plant received the most “hits” including the turtles “Wrinklebutt” and “Pappy”. This receiver record the presence five new turtles tagged late in the year. These newly tagged turtles are LB337 and LB355 tagged 16 November 2007, as well as X168/169, X143, and 126277750A tagged 17 December 2007. All of the SURs at our new South Fence sites recorded the presence of turtles with the exception of South Fence 3 (SUR 00402, which was damaged). The presence of turtles were also recorded at the Sweetwater station, and in the channels both north and south of the power plant. In summary, the presence of 9 of the 21 tagged turtles were recorded during this phase of the study, and the presence of the turtles was recorded at 6 of the 8 recovered South Bay SUR stations.

Future plans

The plans for the next step include:

1. Deployments of more SUR units
2. Improvements in anchoring system to deter thefts
3. Deployment of another GPS-linked satellite transmitter
4. Comparison of acoustic and GPS telemetry
5. Calibration and sensitivity tests of SUR units in the field
6. Enlist the help of local fishermen and kayakers to locate missing SURs.

Table 1. Summary of ultrasonic transmitter deployments on green turtles during the 2005-06, 2006-07, and beginning of 2007-08 capture seasons. The tags used in this effort were Model CHP-87L manufactured by Sonotronics Inc. (Tucson, Arizona)

ID	Capture date	SCL (cm)	Mass (kg)	Freq. (kHz)	Pulse width (ms)
CM8360	1/19/2006	-	100	39.0	957
CM8355	1/19/2006	-	152	38.0	942
CM13581	2/1/2006	95.3	109	36.0	910
CM5675 (Charlie)	3/2/2006	82.8	80	37.0	927
CM12114	4/20/2006	76.3	65	35.0	921
CM20003	12/5/2006	107	196	35.0	987
CM3030 (Pappy)	12/14/2006	89.7	131	35.0	900
LB343 (Herman)	12/14/2006	93.9	120	35.0	921
CM5867	1/23/2007	93.0	101	36.0	967
CM7218	1/23/2007	99.3	116	37.0	955
CM2116 (Oscar)	2/8/2007	102.6	130	37.0	990
CM4363A	2/21/2007	60.5	28	36.0	1050
LB353	2/21/2007	100.3	127	40.0	1030
X116 (WB)	3/7/2007	103.1	240	35.0	930
LB358 (Dusk)	5/23/2007	70	46	38.0	1130
LB337	11/27/2007	80	68	39.0	970
LB355	11/27/2007	70	38	37.0	950
X168/169	12/17/2007	95.2	113	36.0	1010
X143	12/17/2007	102	140	39.0	950
126277750A	12/17/2007	52	19	38.0	1250
LB382	12/17/2007	110.4	231	36.0	990
132316632A	1/10/2008	95	129	38.0	1170
53R	1/10/2008	98.5	136	40.0	990

Table 2. Deployment location and date for Submersible Ultrasonic Receiver (SUR) stations in San Diego Bay as of 8 January, 2008. SUR ID can be matched to locations on Figure 1b. These devices were manufactured by Sonotronics Inc. (Tucson, Arizona).

SUR ID	Latitude	Longitude	Location	Date deployed
00393	N32.61359	W117.09852	By the ramp (PP)	1/8/08
00397	N32.71250	W117.17590	Fish Mkt	11/16/07
00213	N32.72705	W117.18537	Corvair Lagoon	11/16/08
00400	N32.63322	W117.11208	Green 13	1/8/08
00401	N32.61275	W117.10486	S PP Mid-Chnl	1/8/08
00390	N32.62743	W117.11011	Red 18	1/8/08
00392	N32.62228	W117.12766	Green 21	1/8/08
00215	N32.70031	W117.16476	Ferry Gazebo	11/16/07
00207	N32.70000	W117.17026	Ferry Landing	11/16/07
00406	N32.64671	W117.11837	Sweetwater	1/8/08
00404	N32.61353	W117.09976	PP Channel	1/8/08
00206	N32.60806	W117.11971	S. Fence 1	1/3/08
00270	N32.61168	W117.12108	S. Fence 2	1/3/08
00398	N32.61632	W117.12337	S. Fence 3	1/3/08
00403	N32.61786	W117.10947	N PP Mid-Chnl	1/8/08
00409	N32.61698	W117.11142	N PP Channel	1/8/08



Figure 1a. Deployment locations of SUR units in San Diego Bay from July 2007 to January 2008. Circles indicate approximate conservative range of reception (500m).



Figure 1b. Current deployment locations of SUR units in San Diego Bay beginning in January 2008. SUR station details are documented in Table 2.

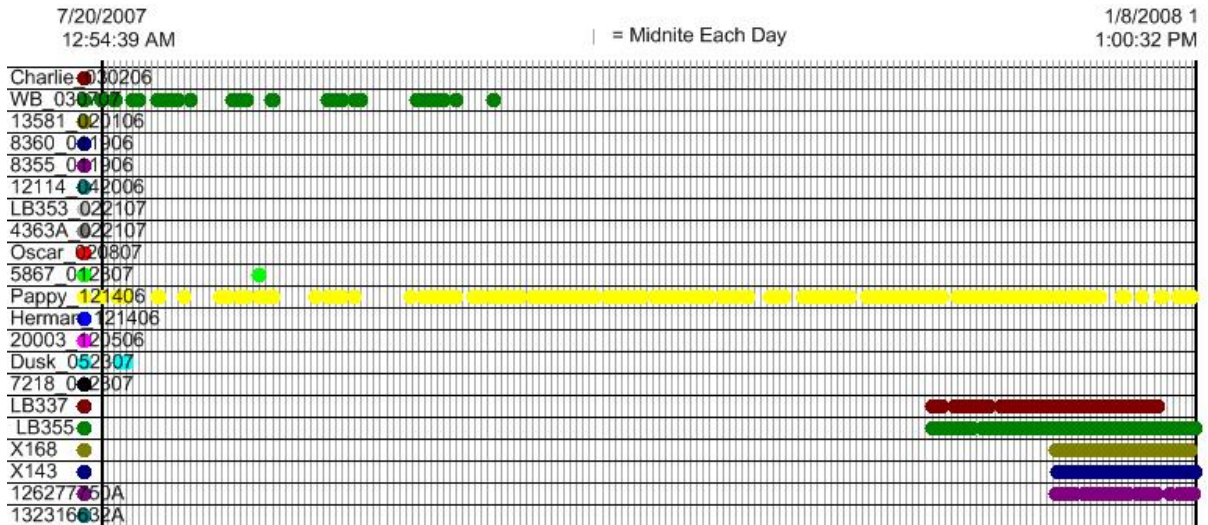


Figure 2a. Presence/absence records of green turtles equipped with acoustic tags in San Diego Bay at the SUR station 00393 (Mid-Channel South of Power Plant; Fig. 1a). Each filled circle indicates the detected presence.

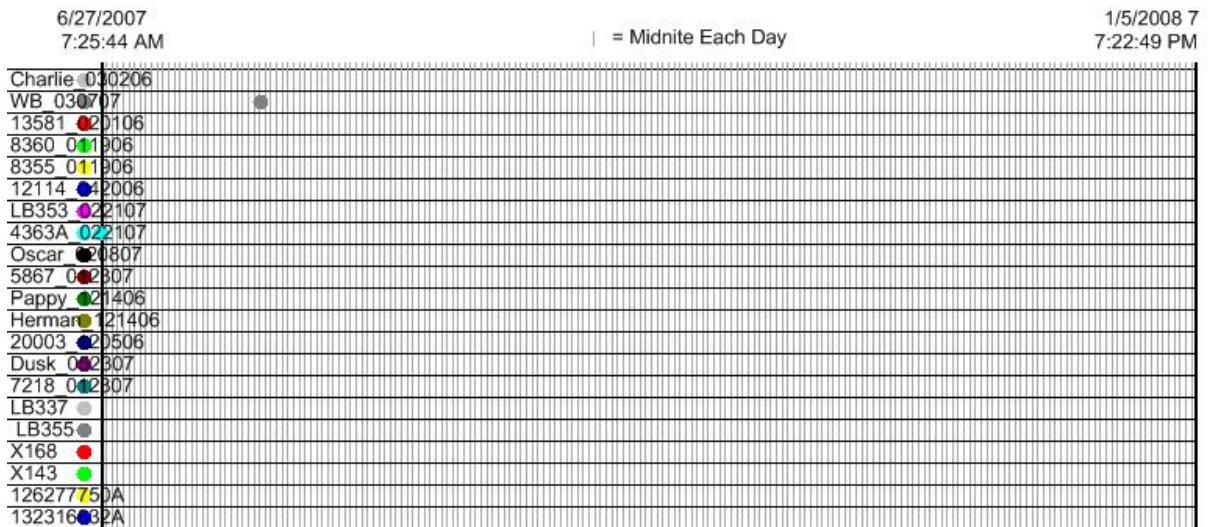


Figure 2b. Presence/absence records of green turtles equipped with acoustic tags in San Diego Bay at the SUR station Green 21 Station, SUR 00396 (Figure 1a). Each filled circle indicates the detected presence.

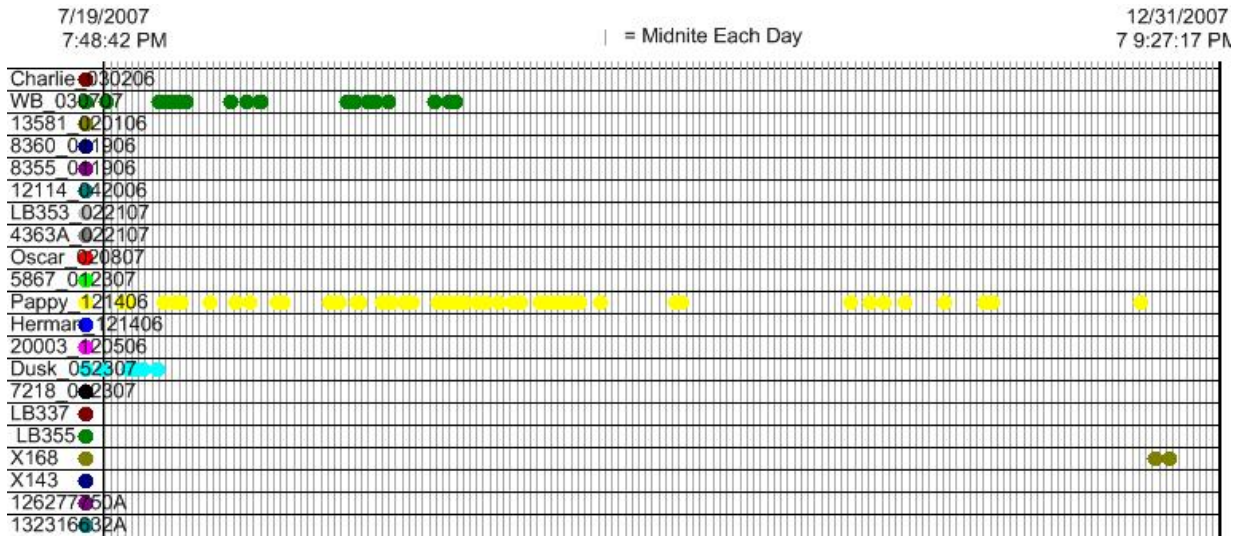


Figure 2c. Presence/absence records of green turtles equipped with acoustic tags in San Diego Bay at the SUR station South Fence 1, SUR 00400 (Figure 1a). Each filled circle indicates the detected presence.

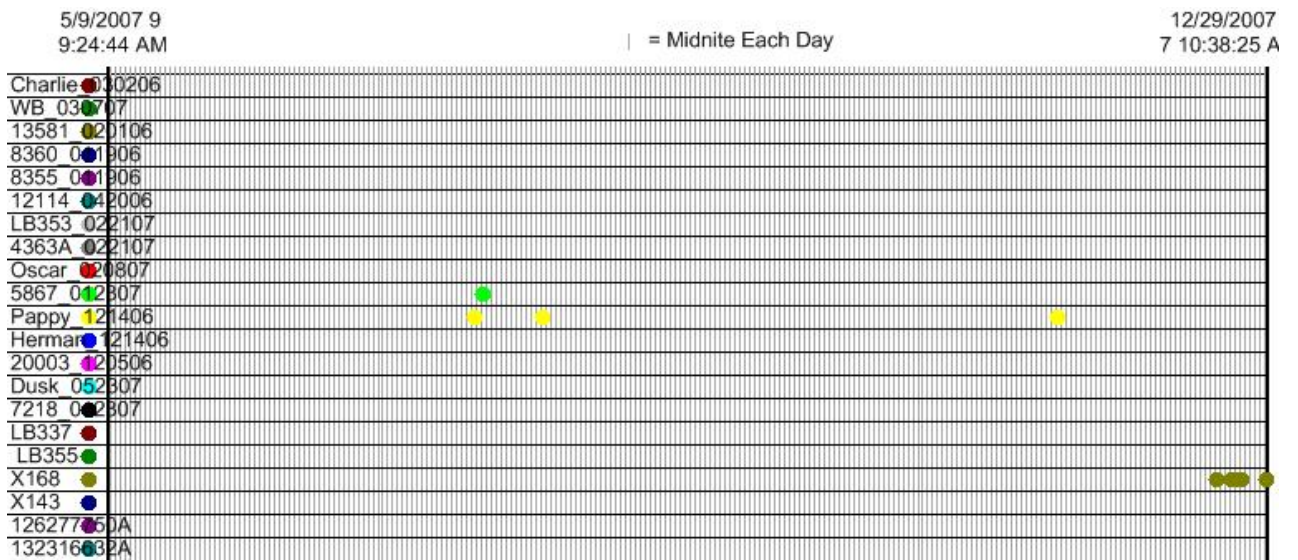


Figure 2d. Presence/absence records of green turtles equipped with acoustic tags in San Diego Bay at the SUR station South Fence 2, SUR 00401 (Figure 1a). Each filled circle indicates the detected presence.

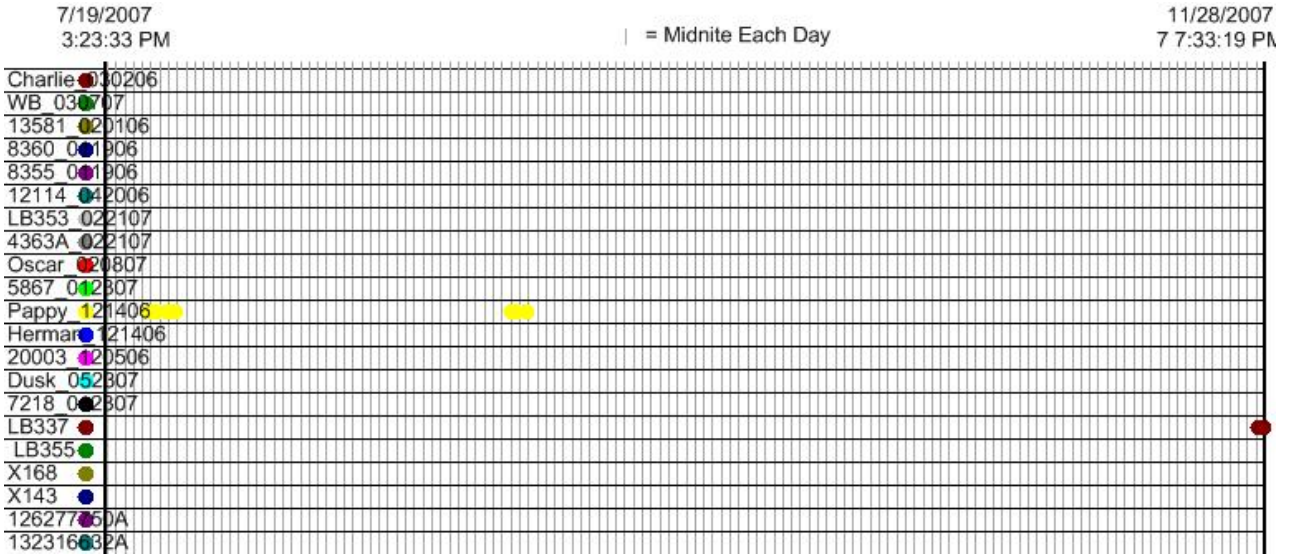


Figure 2e. Presence/absence records of green turtles equipped with acoustic tags in San Diego Bay at the SUR station Mid-Channel North of Power Plant, SUR 00407 (Figure 1a). Each filled circle indicates the detected presence.

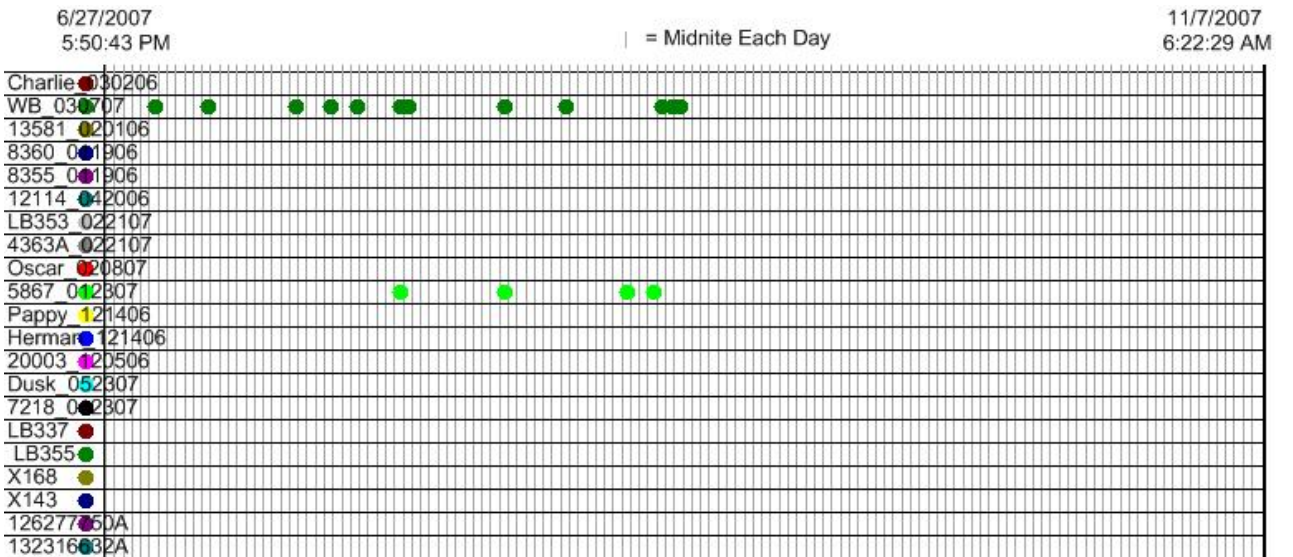


Figure 2f. Presence/absence records of green turtles equipped with acoustic tags in San Diego Bay at the SUR station Sweetwater, SUR 00408. Each filled circle indicates the detected presence.

Note: There is a possibility that single dots may be ‘false positives’ where an SUR detects ambient noise as a signal.