



**Guide to Monitoring Beach Conditions
Guía Sobre el Monitoreo de las Condiciones
de la Playa**

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ARCAS-EVS-AMBIOS

WHY WE NEED THESE DATA

Throughout the turtle nesting season beach profile measurements are recorded to determine the changes of the profile of the beach across our 8km study area. The changes in beach slope and sand particle size, brought about by changing wind/wave conditions, may help to explain the spatial and temporal variability we observe in the Olive Ridley turtle nesting patterns on these beaches.

METHODOLOGY

Profiles are measured at nine locations spaced at 1km intervals either side of the hatchery (see the diagram). These profiles must be measured weekly to enable understanding of the changes that occur. The best time to measure the profiles is 1 hour before until 1 hour after low tide, (which can be obtained from the tide chart) to access as much as possible of the beach width. Use of a motorbike greatly eases the logistics of collecting these data. The work requires two people minimum.

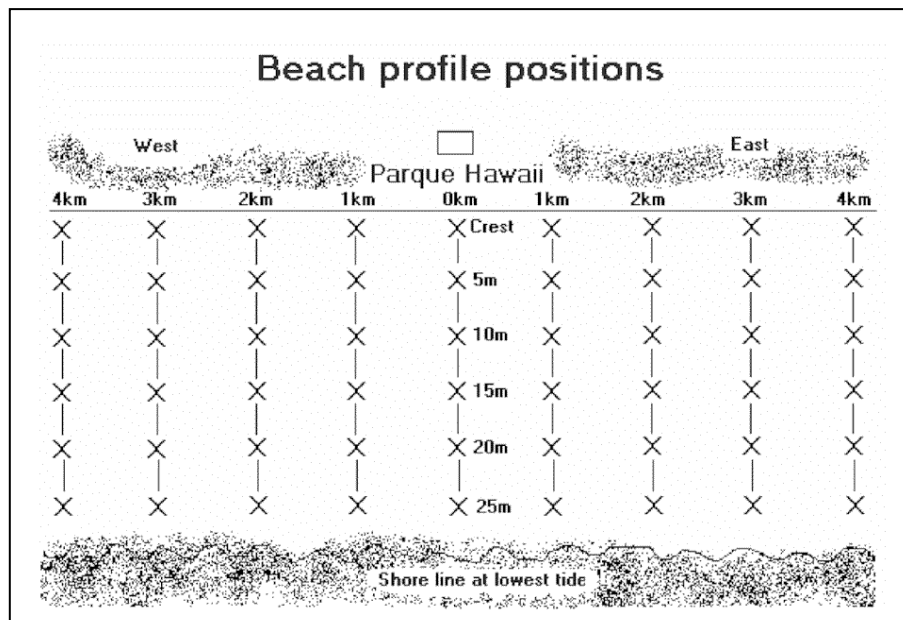


Figure 1. Marker positions across the study area.

At the start of each nesting season install a marked point using a (disguised) half buried concrete block at the beach-crest end of each profile. This allows precise relocation of the profiles of each survey, and gives a constant level for reference purposes. A viewfinder/tripod will rest on the horizontal flat surface of this block. Mark the block positions using the GPS and a descriptive well drawn map of the locations to enable finding the block each time.

Profile Measurement

To record the profiles you will need a 50m tape measure, 2 X 2m plastic drainpipes (of which one is slightly smaller to slide inside the other), the smaller diameter pipe with marked cm increments, a 1m extension pole that clips onto the top of the wider tube and a simple viewfinder connected to a small tripod.

When you arrive at each location, you will need to run the tape measure from the concrete block at the crest of the beach all the way down to the waters edge, aligned at 90° to the line of the coast (across the beach).

One person sets the viewfinder on the concrete block at the crest of the beach and (lying down) looks through and adjust the tube vertically until the line of the horizon runs through the centre of the viewfinder, and horizontally until the Pole held up from the tape on the beach is visible (see figure 2)

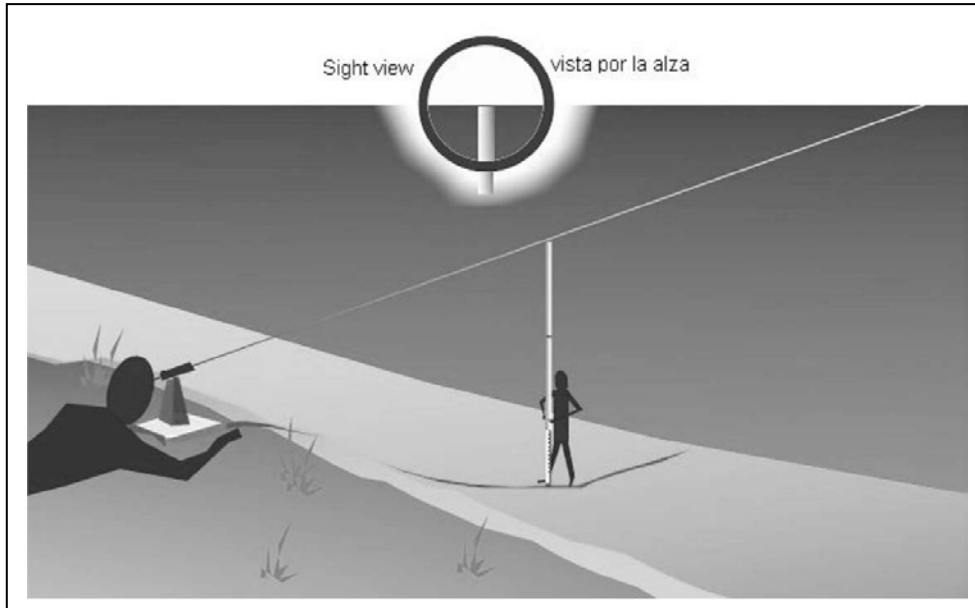


Figure 2. Use of viewfinder, tape and poles.

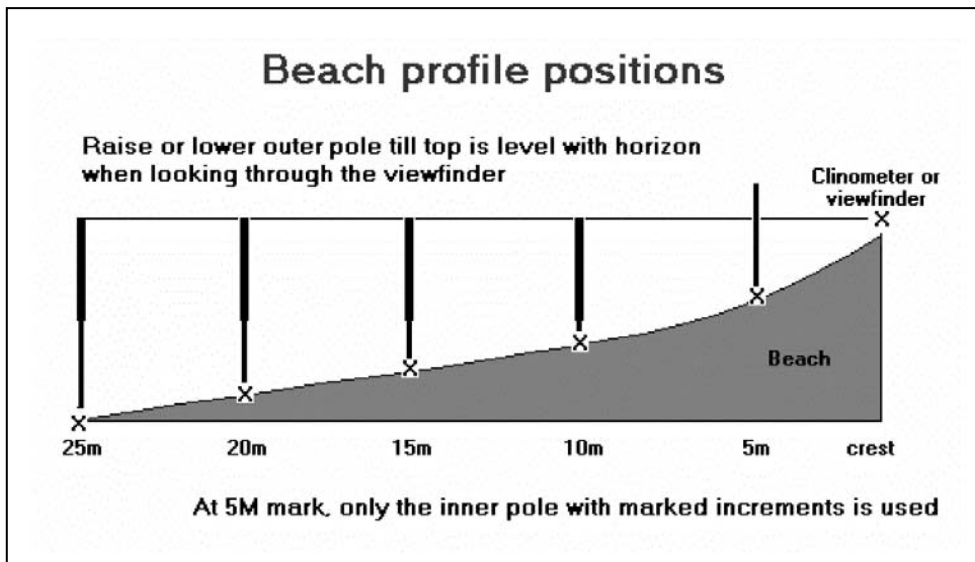


Figure 3, Cross-Profile positions

Initially, using just the narrower marked inner pole, zero cm at the bottom, the person holding the pole will stand at the 5m mark on the tape and hold it vertically, standing to the side of the pole so that the pole and line of horizon can be visible through the viewfinder tube, and they hold a finger pointing horizontally across the marked cm points. The person looking through the viewfinder will indicate whether to move their finger up or down until it is perfectly in line with the line of horizon. This exact reading in cm will be noted in the data book as the first profile point (at 5m).

Move down to the 10m mark and repeat the procedure. Usually both poles will now be needed. With the smaller pole inside the larger pole (zero cm at the bottom still), the outer pole is moved up or down until, through the viewfinder, the VERY TOP of the upper/outer pole is perfectly in line with the horizon. The reading in cm where the inner pole goes inside the outer pole, PLUS 2m (the length of the upper/outer pole) is the correct reading. Note this reading for the 10m mark.

Repeat this process also at the 15m, 20m, 25m, 30m etc mark to successfully complete the measurements needed to obtain a profile of the beach AS FAR TO SEAWARD AS POSSIBLE GIVEN THE STATE OF THE TIDE.

The 1 metre extension to the upper/outer pole will be needed at about the 25m mark and beyond; the correct reading in these cases is the cm readout PLUS 3m.

When the data has been collected you will need to enter it onto the computer. Below is the EXCEL spreadsheet used for recording this data.

Date: 19/07/04	Time: 09:00 - 11:00				Low tide: 10:00				
Profile Point	West (Monterrico)				P.H	East (Hawaii)			
	4km	3km	2km	1km		0km	1km	2km	3km
5m	145	126	116	141	135	90	98	115	119
10m	241	197	201	233	233	185	178	210	186
15m	301	253	284	302	281	247	237	267	228
20m	359	309	333	360	342	302	298	321	272
25m	400	363	388	401	402	359	347	369	318

Table 1. . Beach profile excel spreadsheet

Sand Sample Collection

At each profile you will need to collect two sand samples. One is collected at the lowest tide position possible and the other at the top of the beach a few metres below the vegetation. Scoop out one big handful of sand (don't just scrape away the loose surface sand). Try not to let sand run through your fingers – bag the whole amount you scoop up. On a scrap of paper note the date and the km position and TOP. This note will be placed in the bag of sand from the top of the beach and the two bags tied together. There's no need to mark the sand from the bottom of the beach as the note will absorb water and become unreadable anyway.

GPS Positions of markers	West (Monterrico)	4km	775167- 1535167
		3km	776090- 1535447
		2km	777009- 1535149
		1km	777978- 1534800
	Parque Hawaii	0km	778862- 1534475
		1km	779829- 1534102
	East (Hawaii)	2km	780755- 1533731
		3km	781677- 1533350
		4km	782583- 1532974

West (Monterrico)	4km	after lighthouse and fence next to tree stumps
	3km	left of middle pole of boat hut
	2km	near small hut with purple pillars. Right of white hut, 2nd palm tree
	1km	after lancha and fence, 4th pole of second fence, just left of tree stump
Parque Hawaii	0km	brick in front of 4th palm tree
East (Hawaii)	1km	in front of middle pole of first rancho next to mirador
	2km	after dolphin house and fence, just right of large post
	3km	after water deposit tower, after hut, in front of 14th post. Marker with a log
	4km	before house with pink wall, in front of electricity post with square box

Table 2. Examples of noting the GPS positions and descriptions of the beach profile locations.

Weighing sand samples

The sand samples you have collected during the beach profile measurements will need to be prepared for sieving and weighing.

First empty the sand samples onto small trays (paper plates?) and place in the sun and out of the wind. (A sun oven; ideally a glass cabinet is perfect if one is available, if not construct a shelf framework and cover it with transparent plastic sheeting, ventilated). These samples usually only take a good day in the direct sunlight to dry, but if needed then leave them a little longer to dry fully.

It is essential to carefully label the “drying trays” with an identifying code or its exact location number (date, profile number, Top or Bottom of beach). Each tray in turn will need to be shaken through a tower of sieves in order to analyse the granular content of each sample.

- Empty the sand sample onto the scales and remove any plant matter, human artefacts etc. DO NOT SUBSAMPLE – it is essential to use ALL THE SAND COLLECTED.
- Make sure the sieves are in order – coarsest mesh (1000 micron) at the top, finest at the bottom (250 micron). Place the sieve tower in a clean dry bucket in order to catch the small particles which might pass through the finest sieve.
- Empty the first sample into the top sieve and shake the tower from side to side for several minutes so that the particles fall through the sieves and catch the particles according to their size.
- Remove sieves one at a time from the top of the tower. Before removing each sieve, brush vigorously with a dedicated paintbrush to ensure that all the particles finer than that mesh size pass through into the sieve below.
- Invert the sieve carefully over a sheet of paper and use the brush to clean particles jammed in the mesh (NB its impossible to clean out all). Empty the sand on the paper onto the scales and record the weight against the sieve size in the datasheet. After weighing make sure this sand is kept together on a tray in case it needs to be measured again. This needs to be done because sometimes the end total is different than the starting weight. Make sure the weighing process is done indoors so as to avoid any loss by the wind.
- If the contents of any sieve are less than 1 gram then it needs to be recorded as a T (trace).
- Repeat this process until you reach the final sieve.
- The remaining particles in the bucket are again weighed and recorded as weight of particles “less than 250 microns”.
- Add the total of each sieve sample and ensure it is the same as the starting weight. If it is more than 5 grams different then the entire sample will need to be measured through the tower again.

Loc.	Date	T/B	Sand sieve size								Total gms
			2mm	1.5mm	1mm	710u	500u	355u	250u	<250u	
-4	26/07/2004	T	0	0	0	T	5	20	26	29	80
-4	02/08/2004	T	0	0	0	T	4	35	36	25	100
-4	09/08/2004	T	0	0	0	T	2	22	13	16	53
-4	16/08/2004	T	0	0	0	T	3	18	22	20	63
-4	23/08/2004	T	0	0	T	T	5	22	19	25	71
-4	30/08/2004	T	0	0	T	1	10	43	17	13	84
-4	06/09/2004	T	0	0	0	T	5	25	14	14	58
-4	13/09/2004	T	0	0	0	T	4	22	13	9	48

*Table 3.
Sieving
results
spreadsheet*