

## Random Point Contacts (RPCs)

### **Purpose**

To estimate substrate composition and percent cover of selected algal and invertebrate taxa

### **Materials**

- 1 random point contact (RPC) bar: a 1.5 m rebar-filled PVC rod with 2 strings attached, each string with 5 knots. The strings are 1.8 m long and 1.2 m long. The long string attaches to the ends of the bar and the short string attaches 25 cm from each end. Knots are at least 20 cm apart and are colored with a bright red or orange marker
- 1 set of surface-supplied diving equipment: Diver Control System (DCS), Aga/Guardian mask, umbilical and pony bottle unit
- 1 set of RPC data sheets (Appendix K)
- 1 clipboard and pencils
- 1 underwater species list reference card for diver (optional)

### **Personnel**

- 1 console operator/data recorder
- 1 line tender and backup diver (as appropriate based on surface supplied dive regulations)
- 1 surface supply diver experienced in the identification and search image needed for species listed in Table 7.

### **Methods\***

The diver will sample 40 points from each of the 15 systematic points (meter #) with a random start along the main transect. At the start of each field season a new sampling point must be randomly selected. The initial sampling point (a number between 0-6) is chosen using a randomized selection method. That number will be the meter number that the first set of 40 points is taken from. The subsequent sampling points along the line are at 6.67 m intervals rounded to the nearest whole number (7 m, 16 m, 20 m, etc). Each sampling point is recorded consecutively on the top of the data sheets corresponding to quadrat 1,2,3 etc. This systematic set of numbers with a random start will be the same at all sites sampled throughout a field season.

**Console operator and recorder (dive tender):** Once the diver is in the water, the dive tender is responsible for telling the diver the meter numbers to be sampled along the transect. As the diver identifies the organisms and substrate under each point, record these as tick marks on the data sheet. Each sampling point (meter #) along the transect line has four columns on the data sheet (Appendix K). Each column corresponds to the observations taken for two strings on one side of the RPC bar (Figure 6). Each column should have ten substrate tallies; therefore each point (meter #) along the line should have a total of forty substrate tallies. The total number of substrate tallies should be used to double check for missed or double-counted points.

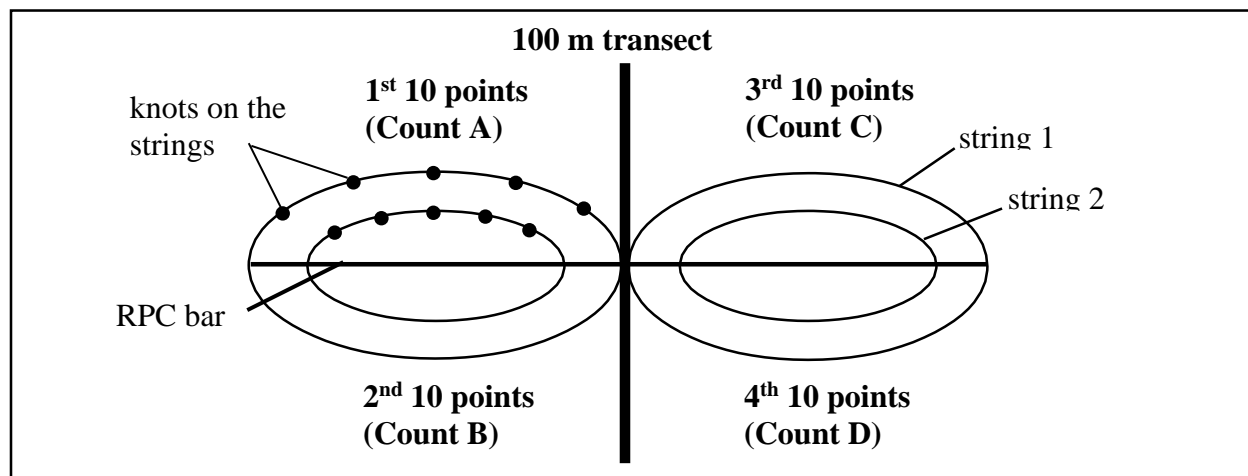
The dive tender monitors SCUBA tank pressure and the diver's air pressure in the umbilical hose. Tanks should be replaced at 500 PSI. It is important for both the tender and the diver to be aware of the diver's depth and bottom time (especially at deeper sites), so the tender should periodically ask the diver for their depth and bottom time.

**Line Tender:** The line tender will aid in feeding out the umbilical hose so that the diver is able to reach the first sampling point, and then help recoil the hose as the diver moves back towards the vessel. The tender will also assist in helping to change tanks and record data if need be.

**Diver:** The diver carries the RPC bar and during descent, locates the transect line. Proceed to the first random sampling point. Place the RPC bar perpendicular to the transect line (Figure 6). Hold it in place and stretch the string taut at each knot perpendicular to the RPC bar. Visualize an imaginary line running vertically through the knot up to one meter above the substratum. Relay to the console operator/recorder the organisms that intersect this imaginary line. Attached or sessile animals providing cover are recorded as “miscellaneous invertebrates”, unless specifically listed on the data sheet. Do not count motile invertebrates (except for *Ophiothrix spiculata*\*\*), but move them to determine what is underneath.

Proceed with identifying all organisms under the knots on both strings on one side of the bar (Figure 6), giving a total of ten points (Count A). Move the string to the opposite side of the bar (Count B) for another 10 points. Next, place the RPC bar on the opposite side of the transect line and repeat the process (Counts C and D). As you move, communicate with the console operator with comments like: “next ten” and “other side of the line” when appropriate. These phrases will assist the console operator and ensure that the proper number of points is recorded in their respective place on the data sheet.

Always name the type substrate at each knot, where: “sand” is sediment that one can push a finger into without hitting rock, “cobble” is rock easily moved by a diver, and “rock” is immovable substrate. “Bare” is used when the substrate is devoid of any apparent living organisms and can be used in combination with any substrate type.



**Figure 6.** Orientation of RPC bar and strings during sampling.

### **Time Required**

Five to fifteen minutes are required for each meter number along the line (75-225 minutes total). Familiarity with the organism list, a console operator/data recorder who is adept at scoring data sheets, and areas with few canopy species will decrease bottom time. Inexperience, heavy surge, and a dense canopy will increase bottom time and a deeper site will often require more than one

diver to complete a site. It is important for the diver to monitor and report depth and bottom time frequently to the console operator during the dive.

\*Additional information on this technique can be found in Carter et al. (1978), Goodall (1952), Johnston (1957), Kemp (1956), and Winkworth (1955).

\*\* A detailed explanation of this exception can be found in the protocol history section.

**Table 7.** Organisms sampled on random point contacts.

Species Name	Common Name
<i>Algae</i>	
green algae	
other brown algae	
<i>Desmarestia</i> spp.	acid weed
<i>Cystoseira</i> spp.	bladder chain kelp
<i>Macrocystis pyrifera</i>	giant kelp
<i>Eisenia arborea</i>	southern sea palm
<i>Pterygophora californica</i>	California sea palm
<i>Laminaria farlowii</i>	oar weed
<i>Sargassum horneri</i>	Sargassum
other red algae	
articulated coralline algae	
encrusting coralline algae	
<i>Gelidium</i> spp.	agar weed
<i>Gigartina</i> spp.	sea tongue
miscellaneous plants	e.g. diatoms, <i>Phyllospadix</i> , etc.
<i>Invertebrates</i>	
<i>Astrangia lajollaensis</i>	La Jolla cup coral
<i>Balanophyllia elegans</i>	orange cup coral
<i>Diopatra ornata</i>	ornate tube worm
<i>Phragmatopoma californica</i>	colonial sand-tube worm
<i>Serpulorbis squamigerus</i>	scaled tube snail
<i>Corynactis californica</i>	strawberry anemone
<i>Diaperoecia californica</i>	southern staghorn bryozoan
<i>Pachythyone rubra</i>	sea cucumber
<i>Ophiothrix spiculata</i>	
other bryozoans	
tunicates	
sponges	
miscellaneous invertebrates	
Bare	No cover; devoid of living organisms
<i>Substrate</i>	
rock	larger than fist-sized
cobble	free-moving, less than fist-sized
sand	sediment you can push finger in up to first knuckle