

Reef Watch Line Intercept Transect Survey Manual

Version 4.1 (7th April, 2008)



Reef Watch Community Monitoring Program
Conservation Council of South Australia Inc.
120 Wakefield St, Adelaide SA 5000
Phone: (08) 8223 5155 Fax: (08) 8232 4782
Email: info@reefwatch.asn.au
Website: www.reefwatch.asn.au



**Conservation Council
of South Australia Inc**



Australian Government



**Government
of South Australia**

Background

The Line Intercept Transect (LIT) is a widely accepted method for obtaining information about the abundance of benthic (bottom dwelling) organisms in terms of percentage cover. The technique has been used effectively for quite a long time on tropical reefs, but has only recently been adapted to temperate conditions. LIT is a rapid, simple method that requires no removal of living material, making it a valuable tool for community based monitoring of South Australian reef ecosystems. The LIT method used by Reef Watch is functionally the same technique as used by researchers at SARDI Aquatic Sciences and other institutions to monitor reefs.

Divers wishing to use this technique to monitor reefs should also refer to the Reef Watch Site Manual.

Uses

Rapid non-destructive survey of benthic habitat. The method focuses on the canopy forming plants and larger (more visible) invertebrate animals. Data provides spatial information on the structure of these communities and is hence a very valuable tool for monitoring benthic reef systems.

Skill

Requires basic diving proficiency and the completion of the PADI Reef Watch Survey Diver LIT survey dive.

Time

A survey will take between twenty and sixty minutes depending on the diver's proficiency, the complexity of the bottom cover and the amount of reef surveyed.

Equipment

Each diver conducting the survey will require:

- 1 metre stainless steel ruler evenly weighted with 1.5kg of lead.
- Reef Watch dive slate and attached pencil (plus spare)
- Reef Watch LIT datasheet on waterproof paper
- Rubber bands
- Catch bag to hold loose equipment

In addition, a shared waterproof tape measure or guide line of at least 10m length is required unless the 50m fish/invertebrate transect line is to be reused.

Method

In addition to the procedures discussed in this section, you should carry out appropriate dive planning and follow standard safety procedures during your dive.

Prior to getting into the water, your pre-dive preparation and planning should include the following:

1. Ensure that you have all of the necessary equipment. Attach your datasheet to the Reef Watch dive slate using rubber bands.
2. Decide the depth and location for your transect lines, referring to the Reef Watch Site Manual. You will need to discuss the various options with your buddy and any other buddy pairs in your survey team.. If your dive is part of an integrated Reef Watch survey you will be able to use one or more 10m segments of the 50m transect line used for fish and invertebrate surveys.
3. Decide how much time can be allocated to the survey, giving consideration to both no-decompression limits and air consumption.

Once in the water:

1. Locate the position for the first transect, as discussed in pre-dive planning.
2. Record the name or initials of Diver 1, the necessary site/transect position details, depth, time of the survey and water movement. The notes are can be used for general habitat notes
3. Unless reusing a transect line from a fish/invertebrate survey, the tape measure or transect line should then anchored, ensuring that organisms are not damaged in the process (try and wrap the line around a rock rather than around plants or animals). Divers then swim along a constant depth contour placing the line according to the instructions reviewed during dive planning..
4. Once the line is laid, the divers begin the survey. One diver should work along the transect line, and the other diver should work along an imaginary line at least two metres from the transect line, but close enough to maintain good visibility and provide assistance if required (for example in the case of an out of air emergency). Divers should orient their bodies so that they are facing each other (see Figure 1).
5. If the conditions are surgy or if only one diver is proficient at conducting the survey, then one diver can assist by holding the ruler in place while the other records the data.

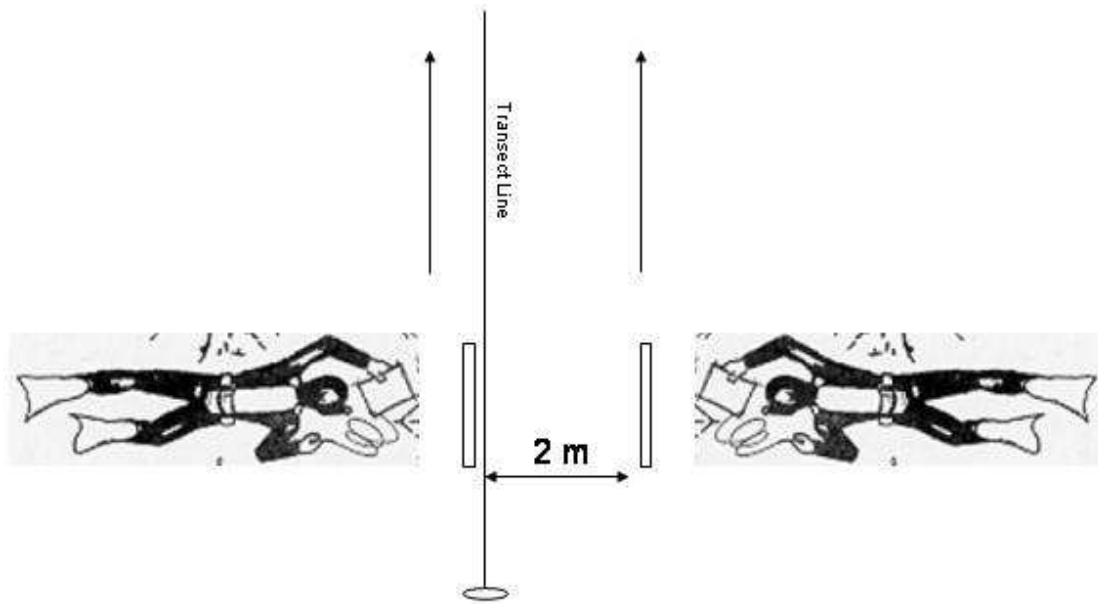
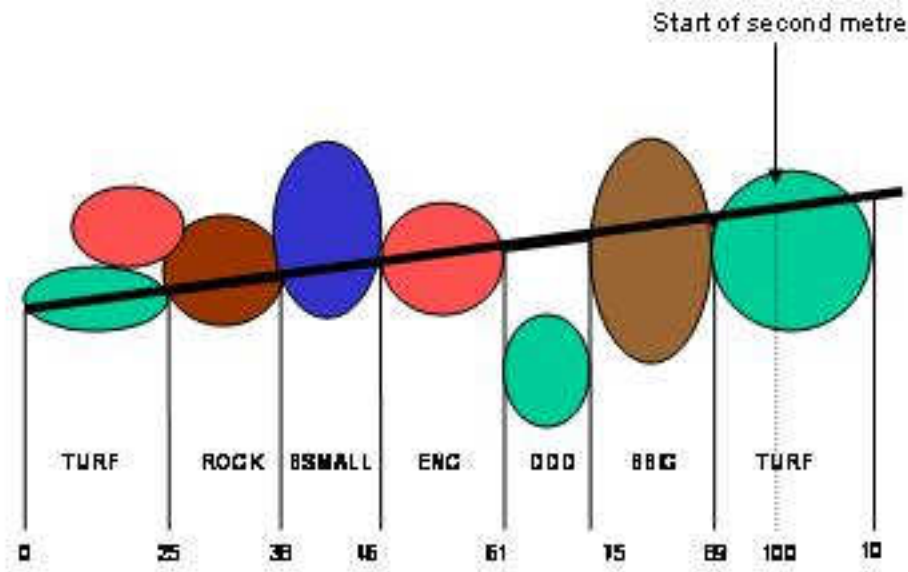


Figure 1. Diver positions during an LIT survey.

Starting the survey:

1. To conduct the survey, the diver first places the ruler over the benthic organisms near the start of the transect, with the zero end of the ruler at the start of the transect.

Note: your ruler placements don't have to follow the line exactly – it is only a guideline. It is OK to make small diversions to avoid obstacles, however DO NOT divert the ruler simply to record something you find interesting as this will bias the survey. When placing the ruler, hold it above the line and then drop it quickly into place so as to pin any moving material. If you move too slowly you will miss a lot of the larger, more mobile species and therefore bias the results. Also, try not to think about when to place the ruler – just do it, don't wait for a particular plant to move under the line as this would be a further source of bias.



| Metre | Transition | Code |
|-----------|------------|--------|
| 1 | 0 | START |
| | 25 | TURF |
| | 38 | ROCK |
| | 46 | BSMALL |
| | 61 | ENC |
| | 75 | DDD |
| | 89 | BBIG |
| (210 bar) | 100 | TURF |
| 2 | 10 | TURF |

Figure 2. An example LIT and the resulting data table. NB: The code DDD is used to identify areas where part of the ruler is more than 20cm above the bottom.

2. Once the ruler is placed the diver can begin to record the details of the benthic lifeforms on the survey sheet. Divers should observe the organisms that lie directly under one edge of the ruler and record the point at which there is a change (transition) to a new lifeform code. You do not need to worry about organisms that are under the uppermost layer or that are off to the side of the ruler. Also, you only need to record lifeform transitions, not each individual plant or animal. (e.g. if there are several organisms of the same lifeform in a row, just record the one lifeform that covers the total transition).

It is essential that for each lifeform you record the position in centimetres at which the transition ends rather than begins (see Figure 2). The best way to ensure this is to use a "START" code at

transition zero, and then it will be intuitive to record the end transition for the remaining lifeform codes.

The organism (and substrate) codes are listed at the top of the datasheet, and explained more fully in the Benthic Lifeform Identification Manual.

3. Generally Reef Watch encourages divers to use a resolution of three cm when undertaking an LIT survey. This means, for example, that a single mussel one cm in size would not be recorded (see Figure 3). However if there were several in a group that occupied a greater than 3cm segment under the ruler then they would be recorded.

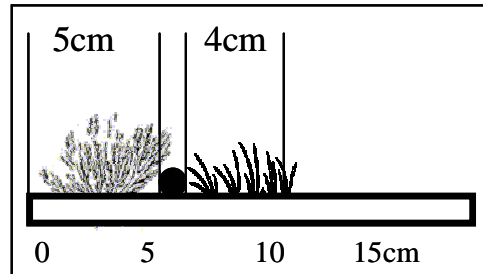


Figure 3: This diagram shows a blue mussel that is less than 3 cm therefore the code used before the mussel includes the mussel.

4. Sometimes you will find that it is impossible to accurately record what is under the line, for example if the substrate drops below the ruler by >20cm. In these instances the diver should record the gap as missing data using the code DDD as in Figure 2.. If the missing data segments are greater than a metre, the level of the ruler may drop between metres and a note should be made. Figure 4 shows some examples of missing data (DDD) and correct placement of the ruler.

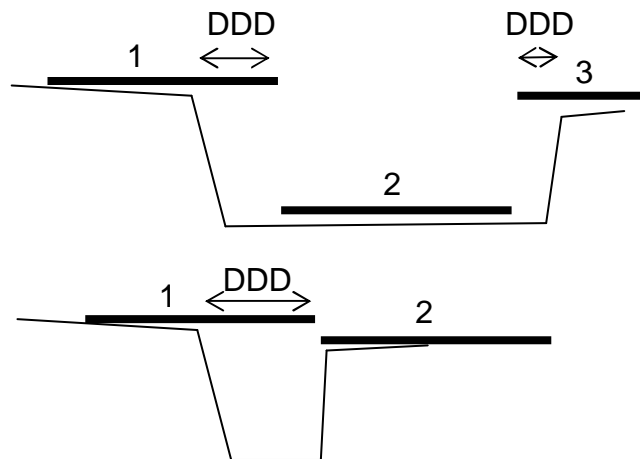


Figure 4: Examples of missing data (DDD) and ruler placement.

Completing the survey

1. The diver works his or her way along the ruler until the entire metre has been surveyed. Each metre should end with a transition of 100cm, even if the lifeform continues into the next metre (see Figure 2).
2. At the completion of each metre, divers should check and record their tank pressure, to ensure enough air is available for subsequent surveys (see Figure 1).
3. The ruler is lifted and placed again 1 metre further along the guide tape and the process is repeated. Try and start subsequent metres as near as practical to the end of the previous one. This way we get an image of the community along the entire line.

Debrief and Data Entry

At the end of the dive, always conduct a brief review of your data, discuss any issues that arose, and compare notes on species identifications and counts. This will improve the quality of the data and enhance your experience for future dives.

Although the diving component of the survey constitutes most of the work, if your data is not reported then you may as well not have done the survey! The best way to report your data is via the Reef Watch website:

www.reefwatch.asn.au.

Click on the "Enter Survey Data" quick link on the home page to get started.

Other ways to return your results:

- Email to: info@reefwatch.asn.au
- Photocopy your slate then fax it to: 8232 4782
- Photocopy your slate and mail it to 1/157 Franklin St, Adelaide SA 5000