

Coral Bleaching

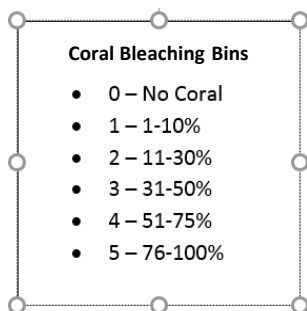
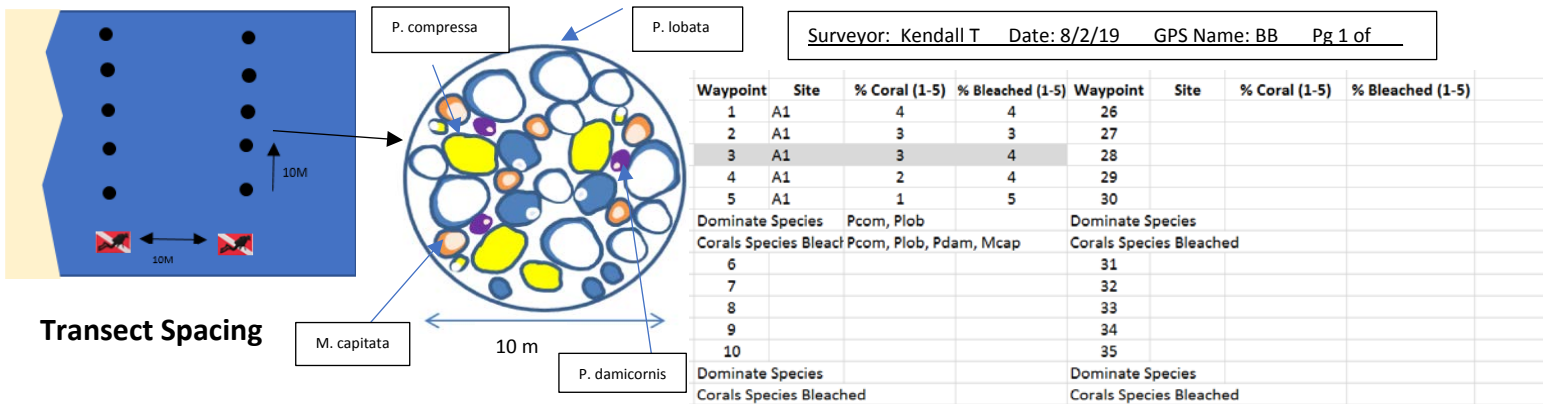
Survey Methodology

In Water Steps

- 1) Teams of 2 or 3 surveyors will line up at least 10m apart
- 2) Take a GPS point every 10 meters
- 3) At each GPS point estimate the percent of live coral in a 5-meter radius (using bins 0-5)
- 4) In the same 5-meter radius estimate the percent of the coral that is bleached (using bins 0-5)
- 5) Continue survey for 5 waypoints
- 6) End of Survey- note the average depth of the transect
- 7) End of Survey- note the dominate coral species in that area
- 8) End of Survey- note the species of coral bleaching in that area
- 9) Move to another area and repeat
- 10) Take some pictures of representative species of the bleaching (doesn't need to be at each site)
- 11) At the end of surveys take a picture of all data sheets

In the Office Steps

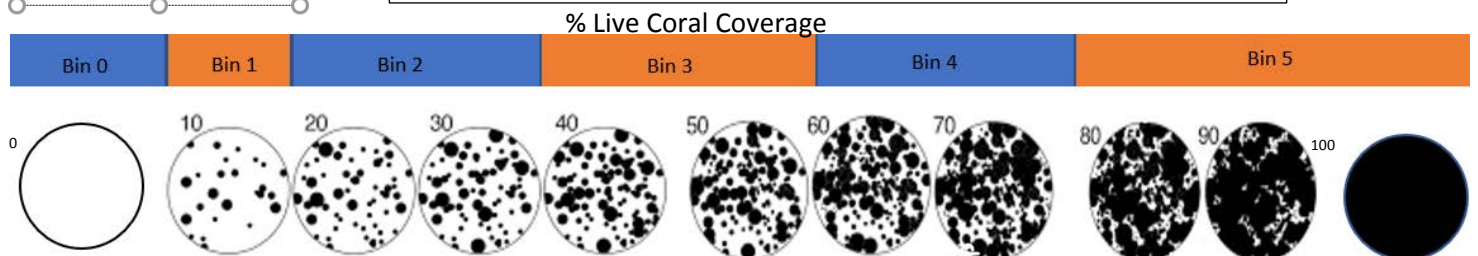
1. Download GPS using DNRGarmin (protocol for download attached)
2. Create a raw file of just GPS points; you will use a separate template file to enter data
3. Each GPS should have their own tab in the excel sheet
4. Verify that the number of points on each datasheet matches the downloads and double check you didn't download the same points twice
5. Enter GPS points from raw file into the survey template and fill in data (template attached)
6. In the notes column record Depth, Dominate Species, and Coral Species



Example:


Using the above 5-meter radius

(Highlighted Data Sheet): 50% coral coverage (Bin 3) and 60% of that coral showed signs of bleaching (Bin 4). Dominate species: *Porites compressa* and *Porites lobata*. Coral species bleached: *Porites compressa*, *Porites lobata*, *Montipora capitata* and *Pocillopora damicornis*



Waypoint	Site	% Coral (1-5)	% Bleached (1-5)	Waypoint	Site	% Coral (1-5)	% Bleached (1-5)
1				26			
2				27			
3				28			
4				29			
5				30			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
6				31			
7				32			
8				33			
9				34			
10				35			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
11				36			
12				37			
13				38			
14				39			
15				40			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
16				41			
17				42			
18				43			
19				44			
20				45			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
21				46			
22				47			
23				48			
24				49			
25				50			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
26				51			
27				52			
28				53			
29				54			
30				55			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
31				56			
32				57			
33				58			
34				59			
35				60			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
36				61			
37				62			
38				63			
39				64			
40				65			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
41				66			
42				67			
43				68			
44				69			
45				70			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
46				71			
47				72			
48				73			
49				74			
50				75			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
51				76			
52				77			
53				78			
54				79			
55				80			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
56				81			
57				82			
58				83			
59				84			
60				85			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
61				86			
62				87			
63				88			
64				89			
65				90			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
66				91			
67				92			
68				93			
69				94			
70				95			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
71				96			
72				97			
73				98			
74				99			
75				100			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
76				101			
77				102			
78				103			
79				104			
80				105			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
81				106			
82				107			
83				108			
84				109			
85				110			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
86				111			
87				112			
88				113			
89				114			
90				115			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
91				116			
92				117			
93				118			
94				119			
95				120			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
96				121			
97				122			
98				123			
99				124			
100				125			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
101				126			
102				127			
103				128			
104				129			
105				130			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
106				131			
107				132			
108				133			
109				134			
110				135			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
111				136			
112				137			
113				138			
114				139			
115				140			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
116				141			
117				142			
118				143			
119				144			
120				145			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
121				146			
122				147			
123				148			
124				149			
125				150			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
126				151			
127				152			
128				153			
129				154			
130				155			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
131				156			
132				157			
133				158			
134				159			
135				160			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
136				161			
137				162			
138				163			
139				164			
140				165			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
141				166			
142				167			
143				168			
144				169			
145				170			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
146				171			
147				172			
148				173			
149				174			
150				175			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
151				176			
152				177			
153				178			
154				179			
155				180			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
156				181			
157				182			
158				183			
159				184			
160				185			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
161				186			
162				187			
163				188			
164				189			
165				190			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
166				191			
167				192			
168				193			
169				194			
170				195			
Depth				Depth			
Dominate Species				Dominate Species			
Corals Species Bleached				Corals Species Bleached			
171				196			
172				197			
173							

1. Downloading Information from GPS Units

- ❖ Open DNR GPS program, and decline any update reminders
- ❖ Hook up the GPS to the computer
 - Newer GPS units will turn on automatically; if using an older unit, turn it on manually
- ❖ In DNR GPS, go to GPS → Find GPS
 - Once the GPS has been recognized, the GPS unit info should appear just below the menu bar
- ❖ Go to Waypoint → Download and wait for waypoints to populate the cells in the program
 - If there is more than one dataset available on the GPS, you will need to choose the appropriate date for the data you want to download
- ❖ Click the top left gray cell next to “type” to highlight all waypoints
- ❖ Use “Ctrl + C” or the copy icon in DNR GPS () to copy all waypoints, and paste into a new Excel workbook/sheet
 - For each GPS, make a separate tab in Excel labeled with the GPS name
 - Check that the number of waypoints matches the number of data entries on the corresponding data sheet, to ensure the data was transferred properly
 - Always keep a raw file of just GPS points and create a separate new spreadsheet for data entry

2. Data Entry and Preparation

- ❖ Create a template for data entry by copying columns from the GPS info and adding columns for each category included in the survey
 - The GPS columns you are left with should be “ident”, “Latitude”, “Longitude”, “y_proj”, “x_proj”, and “datetime”
 - Added data columns should be the fields listed on the datasheet, as well as additional columns for surveyor initials, reef #, and GPS name
 - Ex. coral, ed_ks, gs_as, habitat, etc.
 - Save the template as Project_Location_Date
 - (remember to use _ as spaces mess up in GIS)
 - Ex. Reefs_9_24_43_SnapSurvey_3_8_2016
- ❖ Once all the data has been entered and QC-ed, run a Visual Basic Script (VBS) to combine all the points into one sheet
 - Make sure blanks are filled in with zeroes
 - Make sure headers match the destination file, and text is formatted consistently (uppercase/lowercase)
 - Check the data for inconsistencies that could throw off the GIS mapping
 - Use the Filter tool to easily see inconsistencies
 - Examples or inconsistencies include non-matching Initials (KT vs kt) or Location (Reef 18 vs R18 or 18) etc.

Visual Basic Script

- ❖ In Excel, hold down ALT + F11 keys to open the Microsoft Visual Basic for Applications window
- ❖ Click Insert → Module
- ❖ Copy and paste the following code into the Module window

```
Sub Combine()  
Dim J As Integer  
On Error Resume Next  
Sheets(1).Select  
Worksheets.Add  
Sheets(1).Name = "Combined"  
Sheets(2).Activate  
Range("A1").EntireRow.Select  
Selection.Copy Destination:=Sheets(1).Range("A1")  
For J = 2 To Sheets.Count  
Sheets(J).Activate  
Range("A1").Select  
Selection.CurrentRegion.Select  
Selection.Offset(1, 0).Resize(Selection.Rows.Count - 1).Select  
Selection.Copy Destination:=Sheets(1).Range("A65536").End(xlUp)(2)  
Next  
End Sub
```

- ❖ Press the F5 key to run the script, then close the VBS window
- ❖ All data should be merged into a single sheet named “Combined” in front of all other sheets