



# Reef Fish Checklist

Based on the video *Hawai‘i’s Reefs: Oceanic Oasis*, fill in the following reef fish checklist. For each “survey” or fish count that you do, tally the number of separate times you see each species, and how many fish you see each time. If you need to estimate how many fish you see, do so. Use hash marks to keep count, rather than numerals (e.g., ||| instead of 3).

	1st Survey		2nd Survey	
	# of Sightings	# of Fish	# of Sightings	# of Fish
Hawaiian cleaner wrasse <i>Labroides phthiophagus</i>				
Leaf scorpionfish <i>Taenianotus triacanthus</i> (can be grayish white, yellow, red, brown, or black)				
‘Ū‘ū or Big-scale soldierfish <i>Myripristis berndti</i>				
Pāku‘iku‘i or Achilles tang <i>Acanthurus achilles</i>				
Manini or Convict surgeonfish or tang <i>Acanthurus triostegus</i>				
Lau‘ipala or Yellow tang <i>Zebrasoma flavescens</i>				



## Reef Fish Checklist Comparison Table

Compare the results of your second survey with a partner. Notice whether there are differences between your tallies. Fill in the first two appropriate columns in this table with your results (following the “Y”) and your partner’s results (following the “P”). If there is not time in class, you may complete the “Quantifying Comparisons” section and the questions that follow as your homework assignment.

	2nd Survey Results		Percent Difference	
	# of Sightings	# of Fish	%Difference # of Sightings	% Difference # of Fish
Hawaiian cleaner wrasse <i>Labroides phthiophagus</i>	Y	Y		
	P	P		
Leaf scorpionfish <i>Taenianotus triacanthus</i> (can be grayish white, yellow, red, brown, or black)	Y	Y		
	P	P		
‘Ū‘ū or Big-scale soldierfish <i>Myripristis berndti</i>	Y	Y		
	P	P		
Pāku‘iku‘i or Achilles tang <i>Acanthurus achilles</i>	Y	Y		
	P	P		
Manini or Convict surgeonfish or tang <i>Acanthurus triostegus</i>	Y	Y		
	P	P		
Lau‘ipala or Yellow tang <i>Zebrasoma flavescens</i>	Y	Y		
	P	P		

### Quantifying the Comparisons

Fill in the third and fourth columns of this table using the numbers from the first two columns. Use the formula below to calculate the percent difference between your results and your partner’s results.

Note: Your calculations may result in negative or positive numbers.

$$\text{Percent difference} = (\text{Your result} - \text{Partner result} / \text{Your result}) \times 100$$





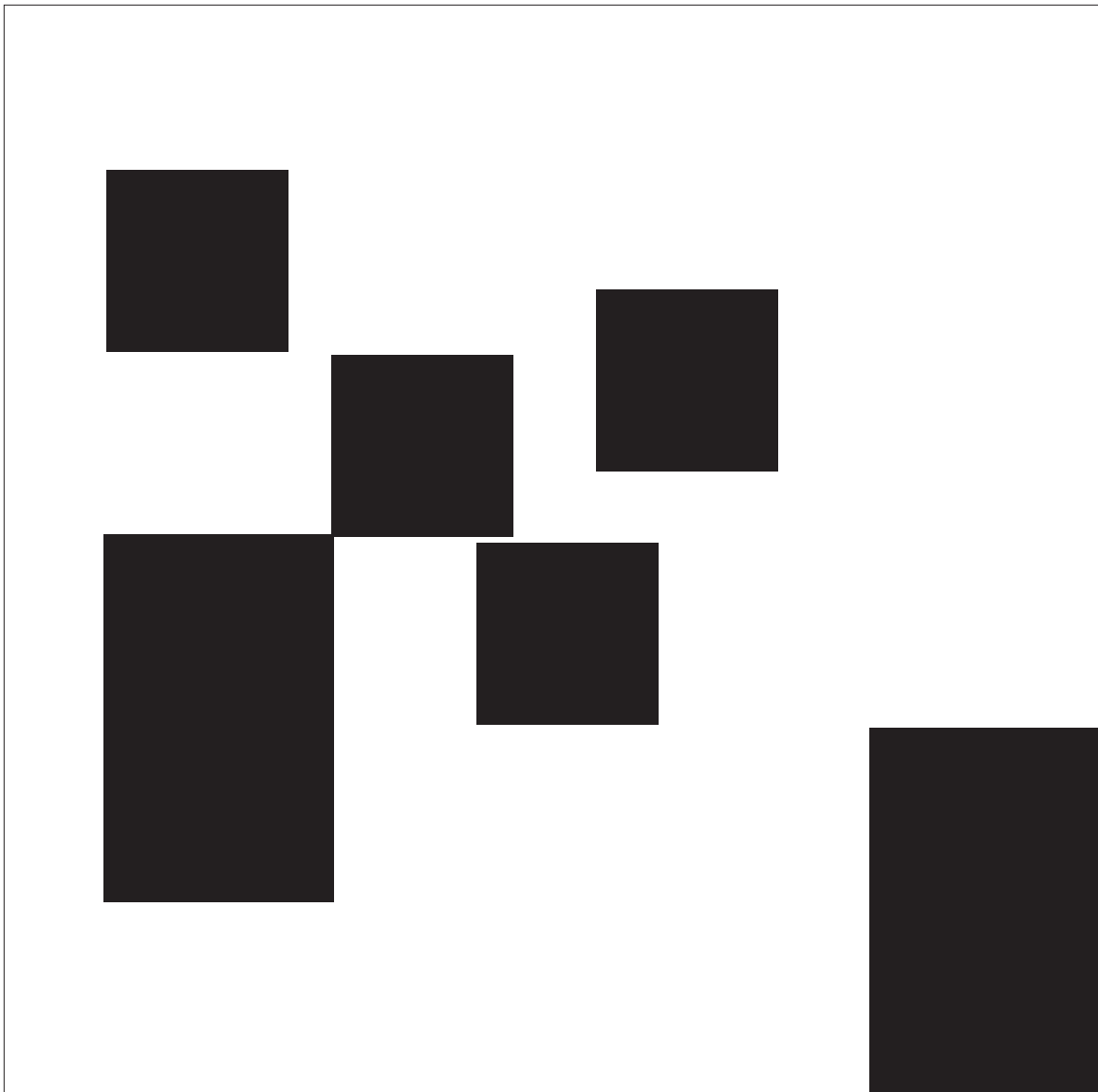
# Estimating Percent Cover

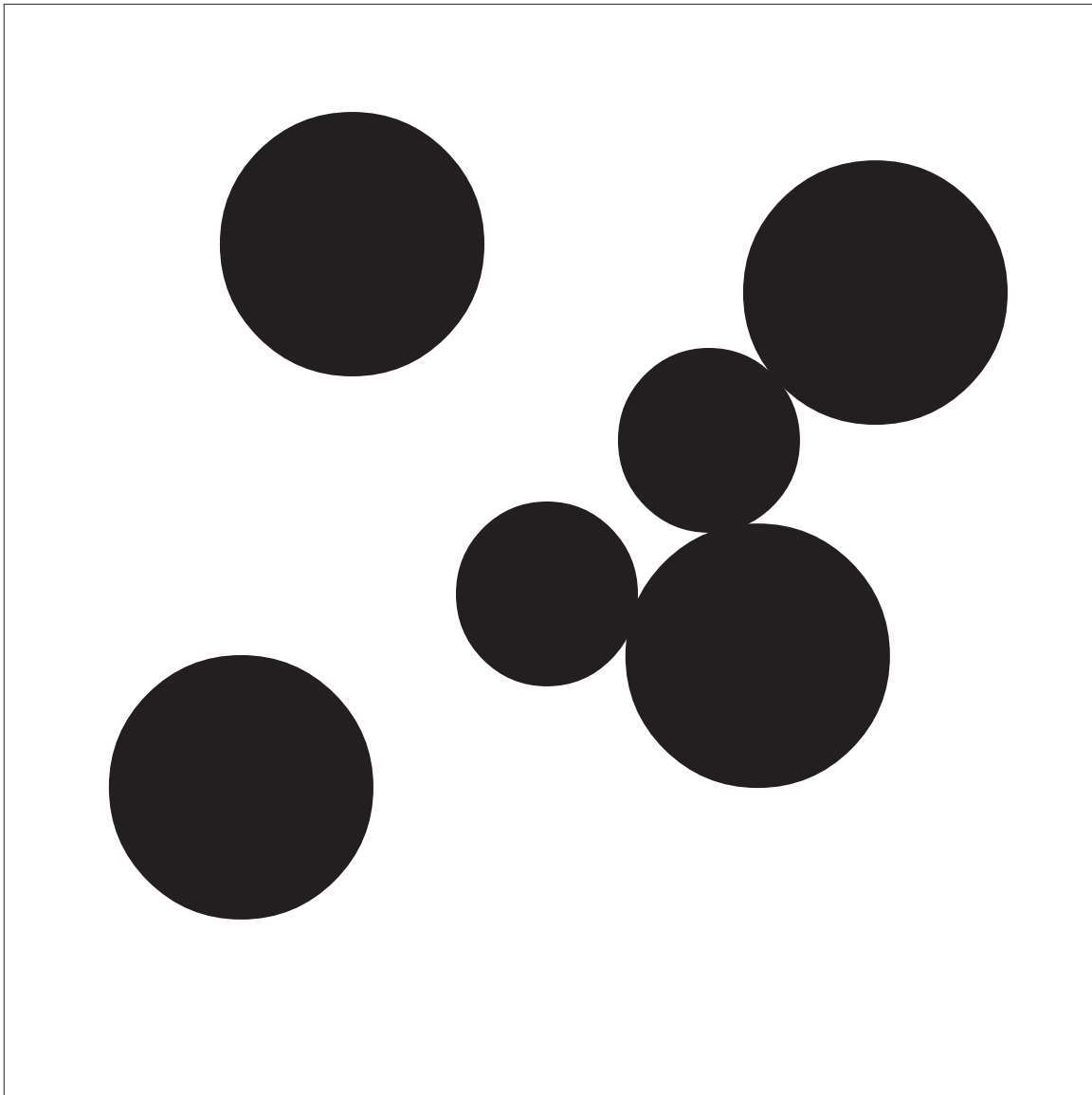
Researchers often estimate “percent cover” as a way of approximating the species composition of a coral reef. Percent cover simply refers to the proportion of a given area covered by a particular species of coral.

Tracking changes in percent cover over time helps scientists describe and evaluate the health of the coral as well as growth and change within the reef community. Changes in the relative proportions of coral reef species, as well as in total coral coverage, are both important because they help scientists understand the natural life cycle of coral reefs and may be signs of changes in factors such as water quality, temperature, numbers and types of predatory marine animals on the reef, or disease.

In this exercise, you’ll practice estimating percent cover using different techniques.

- 1) Estimate the percentage of the area inside the box covered by black without doing measurements.





- 2) Estimate the percentage of the area inside the box covered by black (no measuring).
- 3) Go back to the figures used in #1 and #2 above. *For each figure*, make a new estimate of percent cover using the following method:
  - a) Draw a four -by-four grid that divides the box into 16 sections of equal size. Estimate percent cover in each of these sections, writing your estimates in or next to each cell of the grid.
  - b) Average these estimates to come up with a total percent cover estimate.

Figure #1 percent black cover estimate:

Figure #2 percent black cover estimate:



4) Pick three numbers between one and 16. Write them down here.

Now, go back to the figures used in #1 and #2 above. Your grids divide the box into 16 equal sections. Using the following numbering scheme, select the percent coverage for the sections that correspond to the numbers you selected above.

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Write the corresponding percent cover estimates below and average them:

Figure 1

Figure 2

Section number \_\_\_\_\_ percent cover \_\_\_\_\_ percent cover

Section number \_\_\_\_\_ percent cover \_\_\_\_\_ percent cover

Section number \_\_\_\_\_ percent cover \_\_\_\_\_ percent cover

Average percent cover (include your calculations)



# Get the Point

When researchers analyze photographs of coral reefs, they may use a method in which they generate a number of points that they overlay onto the photograph. The easiest way to generate these points is to use special computer software designed for this purpose. They then record the type of cover that lies directly underneath each point. Researchers then “extrapolate” or predict percent cover of various corals for the entire reef based on this sample. Comparing changes in coverage over time can help researchers track the growth of corals, damage to corals, and how well different species of coral are doing relative to each other.

In this exercise, you’ll work with a partner to determine the percent coral cover in a photograph using two different methods. Each of you will use a different method, and then you will compare findings.

- 1) You take one of the two photo assignment sheets, and your partner takes the other. Follow the directions on your sheet, and when you are finished, compare your findings with your partner’s findings below.
- 2) Fill in the following table with your findings.

	Percent Coral Cover	Percent Other Cover
Grid method		
Random method		

- 3) Do you think that one method was more accurate than the other? Why or why not?



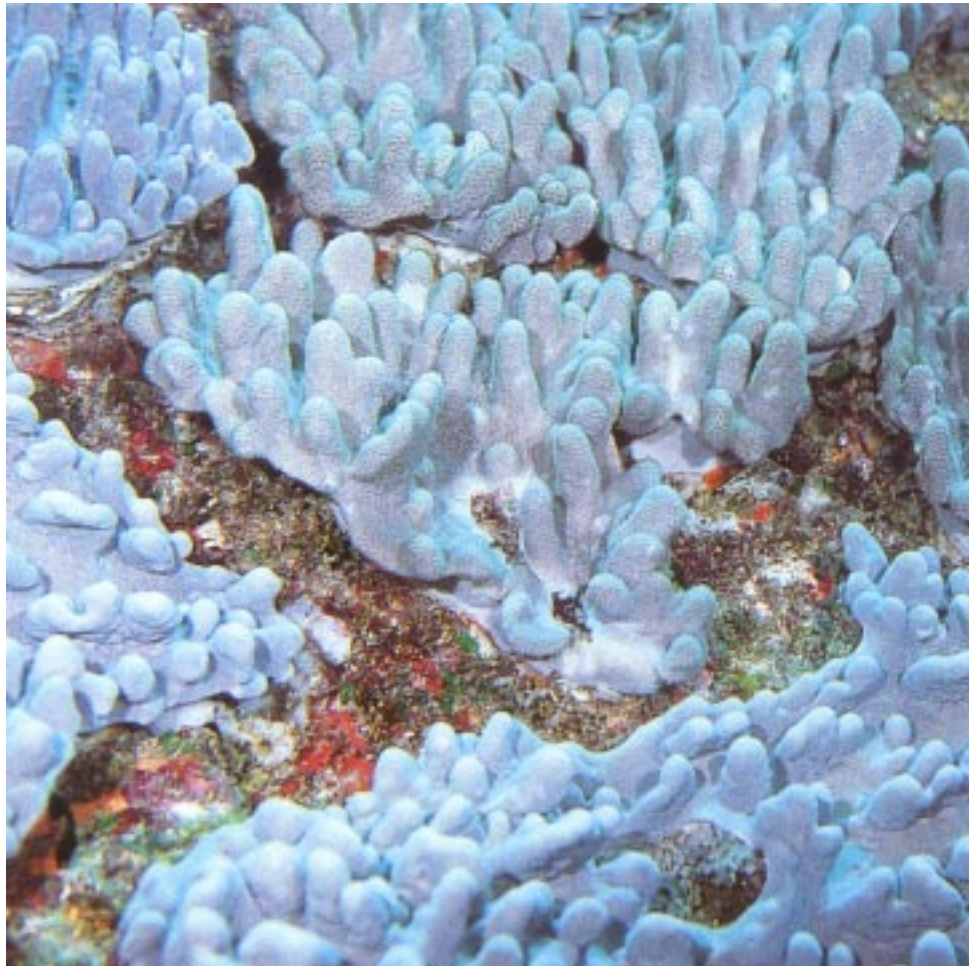
- 4) How would you test to see whether one method was more accurate than the other?
- 5) How could you make both of these methods more accurate?
- 6) How do you think this kind of analysis could help scientists studying coral reefs? Why?





## Photo Assignment Sheet #1: Grid Method

- 1) Draw a five-by-five grid over this photo that divides it into 25 equal sections. Number the intersection points on this grid from one to 16, and write the numbers near each intersection.
  - 2) For each intersection point, record what lies under it on the photo: coral or something else.
- |    |     |     |
|----|-----|-----|
| 1. | 7.  | 13. |
| 2. | 8.  | 14. |
| 3. | 9.  | 15. |
| 4. | 10. | 16. |
| 5. | 11. |     |
| 6. | 12. |     |

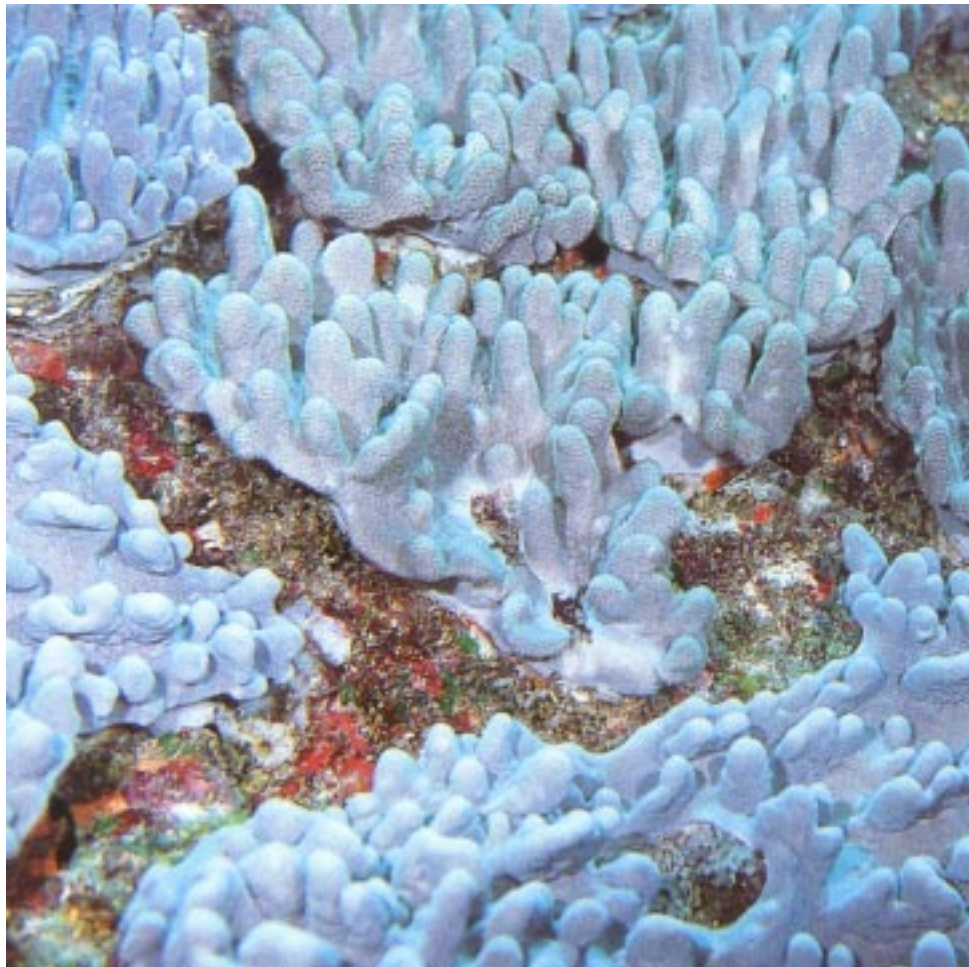


*Leather Coral (Photo: John P. Hoover, Hawai'i's Sea Creatures, Mutual Publishing)*



## Photo Assignment Sheet #2: Random Method

- 1) Close your eyes and use your pen to mark dots on the photograph, as randomly as you can. Continue making dots until you have 16 of them on the photograph itself. Number these points from one to 16, and write the numbers on the photograph.
  - 2) For each intersection point, record what lies under it on the photo: coral or something else.
- |    |     |     |
|----|-----|-----|
| 1. | 7.  | 13. |
| 2. | 8.  | 14. |
| 3. | 9.  | 15. |
| 4. | 10. | 16. |
| 5. | 11. |     |
| 6. | 12. |     |



*Leather Coral (Photo: John P. Hoover, Hawai'i's Sea Creatures, Mutual Publishing)*