Fish Transect Updates- 2013

Sizing Fish

Before discussing how to size fish underwater, we must have a picture of what we are measuring. For the purposes of Reef Check California, we will be measuring total length, which is simply the total length of a fish from the mouth to the tip of the tail (Figure 1).

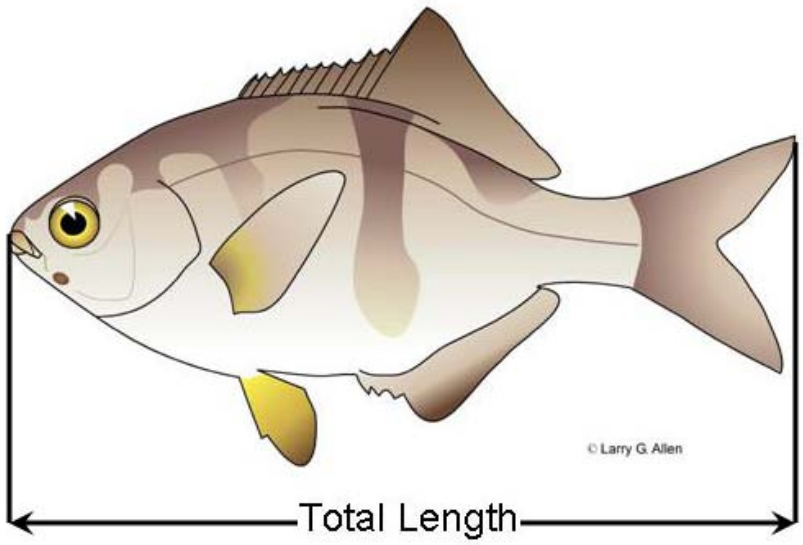


FIGURE 1. TOTAL LENGTH OF FISH, IN THIS CASE A PILE PERCH, IS MEASURED FROM MOUTH TO TIP OF TAIL (ILLUSTRATION © LARRY G. ALLEN).

During a RCCA fish transect you will be sizing individual fish to the nearest centimeter. Once you have identified the species of an individual, you will estimate its size. Estimating sizes of moving fish underwater requires much practice and is probably one of the most difficult things you will be tasked with during a survey. Nevertheless, after initial practice, size estimates should become very accurate (see aids to sizing below). The goal is to estimate the size of each individual to the nearest centimeter, but often this can be challenging, especially if schools of fish are present. In this case, it is possible to bracket the size of a group of fish and write down the largest and smallest size and the number of individuals in the group. For example, if a school of 10 blue rockfish is present and the largest fish is 15 cm and the smallest is 9 cm, you would record: 10 blue rockfish 9-15 cm (for details on how to record this on the datasheet, see section: Recording Fish Transect Data). Young-of-the-year rockfish (YOYs) are not sized but their number is recorded under “YOY” on your datasheet. Please note that divers will record giant sea bass anywhere on the site (not just associated with a transect) but, new for 2013, the size of each giant sea bass will be recorded, following the methods outlined above.

Quite possibly the single most difficult problem in estimating size underwater is to compensate for the magnifying effect of water. Objects appear to be closer and larger underwater. This phenomenon, known as Snell's Law of Refraction, is caused by the refraction of light moving from one medium (water) to another (air inside your mask), and the differing speed of light in the varying media. The amount of refraction (i.e., magnification) is affected by depth, available light, turbidity, the distance of the object to your mask faceplate and even the distance of your faceplate to your eye. As a general rule, however, objects appear 33% larger (which is 4/3 magnification) or 25% closer.

There are several specific factors that contribute to an **underestimation of fish size**:

- Low light
- Poor visibility
- Dull body color
- Objects in foreground
- Deep-bodied or “fat” fish. Pay special attention to species with abnormal proportions of length to height (e.g., garibaldi or black sea perch).

Conversely, there are several specific factors that lead to an **overestimation of fish size**:

- Bright light
- Good visibility
- Bright body color
- Objects in background
- Skinny or elongate fish. Pay special attention to species with abnormal proportions of length to height (e.g., lingcod or senorita).

Aids to sizing

Fortunately, there are several tricks you can use to improve your sizing estimates. The most straightforward is to **measure the span of your hand**. Armed with this information you will be able to begin to develop an idea of size underwater. Another trick is to put easy-to-read marks on your **data slate**. This will give you an idea of exact sizes underwater. Further, you can employ a technique called **bracketing** to help you practice. Bracketing works as follows: you identify a fish sitting on a rock and estimate its size while noting the features on the rock at the head and tail of the fish. You then approach the rock, and (if the fish swims away) measure the distance between the features on the rock/substrate.

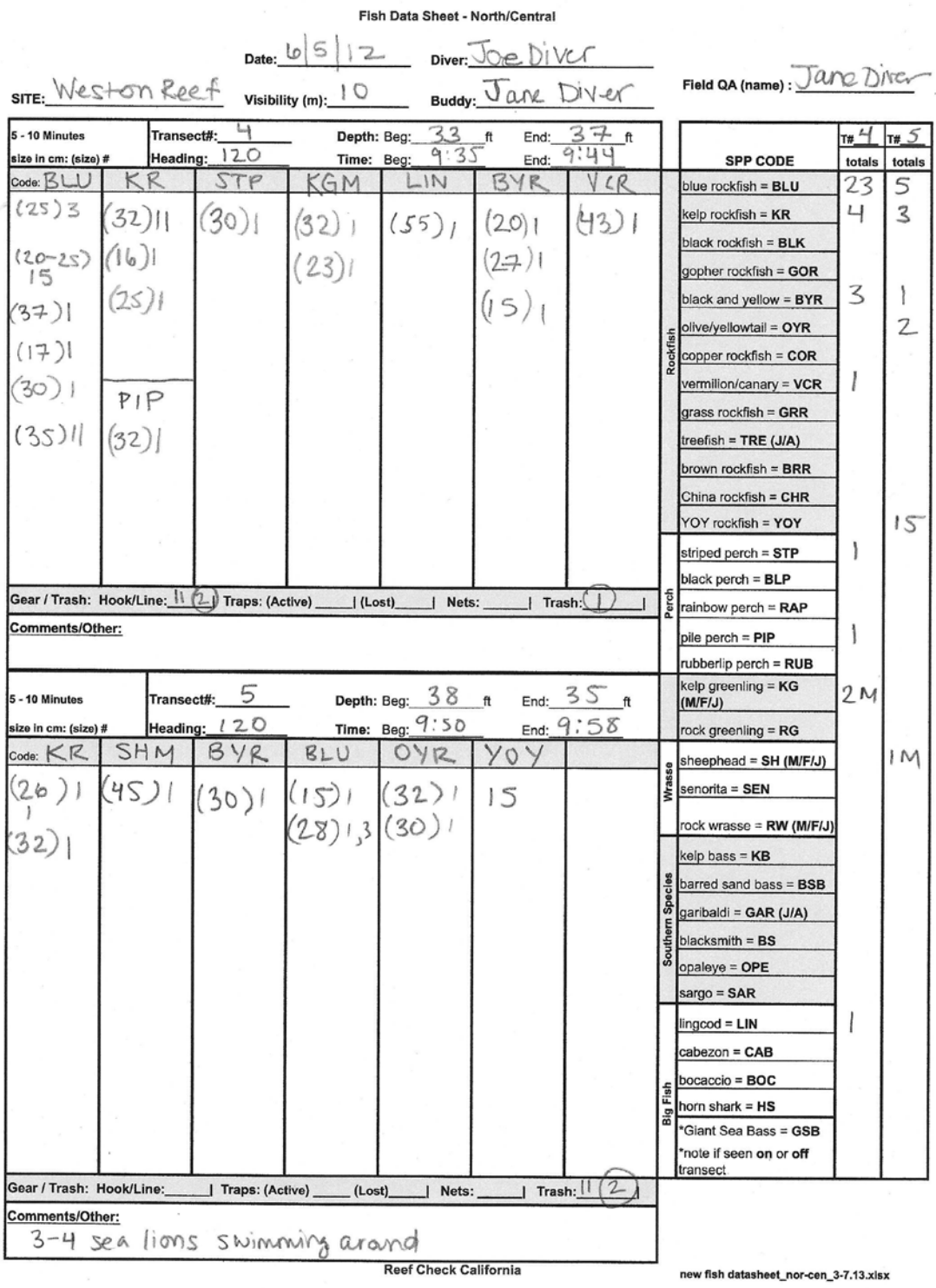
Another helpful practice is to estimate the size of non-moving objects or organisms (e.g., sea stars, sea cucumbers, rocks, etc.) then approach them and measure their size with your slate. After you measure, note if your estimate was below or above the measured size and adjust your estimation before you repeat this process. Doing this before every fish transect on your way to the transect start location will greatly increase your ability to estimate fish sizes accurately.

Recording Fish Transect Data

When counting and sizing fish on transect it is important to record and tally data in a standardized way. With each species seen on transect you record the species code in the grey "code" box on the datasheet. The code for each species can be found in the column on the right. Under the code record the size to the nearest centimeter of each fish seen, putting parentheses around the size estimate. If you ever see additional fish of the same size of that particular species you can put tick marks (III) or the actual number seen (3) next to the recorded size. If you see only one fish of a particular size you must put one tick mark next to the size. If it is not possible to record individual sizes of fishes in a large school, record the size range of the group of fish in parentheses and the number of individuals in that group next to it. There are seven columns on the datasheet for recording individual species during a fish transect. If you find more than seven species on a transect you can split a column by drawing a horizontal line (see Figure 2 for an examples of how to record fish data).

Once you have finished the survey and you are out of the water you must tally up your datasheet. Count the total numbers of individuals of each species and record them in the "transect total" column on the far right of the datasheet. This is also the time to check to make sure that you wrote the correct species codes in the code boxes and to ensure that all sizes and numbers are legible and clear.

Once you have completed your datasheet in this way, have it reviewed by another team member and discuss any observations that seem uncommon or unusual to you. Have the reviewer write his/her name in the 'Field QA' field on top of the datasheet after all issues have been discussed and resolved.



Fish Data Sheet - North/Central

Date: 6/5/12 Diver: Joe Diver

SITE: Weston Reef Visibility (m): 10 Buddy: Jane Diver Field QA (name): Jane Diver

5 - 10 Minutes
size in cm: (size) #

Transect#: 4 Depth: Beg: 33 ft End: 37 ft
Heading: 120 Time: Beg: 9:35 End: 9:44

Code: BLU	KR	STP	KGM	LIN	BYR	VCR
(25) 3	(32) 11	(30) 1	(32) 1	(55) 1	(20) 1	(43) 1
(20-25) 15	(16) 1		(23) 1		(27) 1	
(37) 1	(25) 1				(15) 1	
(17) 1						
(30) 1	PIP					
(35) 11	(32) 1					

Gear / Trash: Hook/Line: 11 (2) Traps: (Active) ____ | (Lost) ____ | Nets: ____ | Trash: (1)

Comments/Other:

5 - 10 Minutes
size in cm: (size) #

Transect#: 5 Depth: Beg: 38 ft End: 35 ft
Heading: 120 Time: Beg: 9:50 End: 9:58

Code: KR	SHM	BYR	BLU	OYR	YOY	
(26) 1	(45) 1	(30) 1	(15) 1	(32) 1	15	
(32) 1			(28) 1,3	(30) 1		

Gear / Trash: Hook/Line: ____ | Traps: (Active) ____ (Lost) ____ | Nets: ____ | Trash: 11 (2)

Comments/Other:
3-4 sea lions swimming arand

	SPP CODE	T# 4 totals	T# 5 totals
Rockfish	blue rockfish = BLU	23	5
	kelp rockfish = KR	4	3
	black rockfish = BLK		
	gopher rockfish = GOR		
	black and yellow = BYR	3	1
	olive/yellowtail = OYR		2
	copper rockfish = COR		
	vermilion/canary = VCR	1	
	grass rockfish = GRR		
	treefish = TRE (J/A)		
	brown rockfish = BRR		
	China rockfish = CHR		
	YOY rockfish = YOY		15
Perch	striped perch = STP	1	
	black perch = BLP		
	rainbow perch = RAP		
	pile perch = PIP	1	
	rubberlip perch = RUB		
	kelp greenling = KG (M/F/J)	2M	
	rock greenling = RG		
Wrasse	sheephead = SH (M/F/J)		1M
	senorita = SEN		
	rock wrasse = RW (M/F/J)		
Southern Species	kelp bass = KB		
	barred sand bass = BSB		
	garibaldi = GAR (J/A)		
	blacksmith = BS		
	opaleye = OPE		
	sargo = SAR		
Big Fish	lingcod = LIN	1	
	cabezon = CAB		
	bocaccio = BOC		
	horn shark = HS		
	*Giant Sea Bass = GSB		
	*note if seen on or off transect		

Reef Check California

new fish datasheet_nor-cen_3-7.13.xlsx

FIGURE 2. EXAMPLE DATASHEET, DEMONSTRATING HOW TO RECORD FISH DATA DURING A RCCA SURVEY

Fishing Gear and Trash Observations

In order to record the amount of marine debris and lost or active fishing gear on rocky reefs, we will count any fishing gear and debris that falls within our 2 meter swath on all fish transects (18 transects). If any part of this gear or trash is within your swath (e.g. the edge of a lobster trap or a piece of monofilament line), it will be counted. Fishing gear that is attached to fish that are recorded on transect (e.g. hook in mouth, trailing line) will also be recorded. Fishing gear and other objects will be broken down into four categories:

Hook and line (recreational fishing tackle) - includes hooks, lures, bobbers, sinkers, fishing rods and fishing line, etc. This category also encompasses spear fishing gear, including spears, tips and guns (spear fishing gear seems to be uncommon and it should be noted in the comments to differentiate it from other gear).

Traps - includes both abandoned (recorded as 'lost') and active (recorded as 'active') traps. Broken and deteriorated traps (i.e., parts of traps) will also be counted. Lobster hoop nets will fall into this category since they serve the same purpose as a trap.

Nets - includes full nets or pieces of net material.

Trash - includes anything manmade that was lost or tossed into the ocean and that doesn't fall into one of the fishing gear categories such as plastics, bottles, cans, metal, anchors, ropes, etc.

Each item from the above categories that is encountered on a fish transect will be recorded on the fish data sheet as a tick mark in its respective category (Figure 2). After the dive, once you have tallied your fish counts, you can tally and circle the total number of each fishing gear and trash observation.