

Standard Operation Procedure (SOP) #17

Visual Fish (atot) and Shrimp (uhang) Surveys in Guam

Version 1.02 (June 3, 2024)

Change History

New Version #	Revision Date	Author	Changes Made	Reasons for Change	Previous Version #
1.01	6/22/2022	Amanda McCutcheon, Anne Farahi	Updates to text and figure, added the datasheet and field guide to the SOP. Added photos of Stenogobius and Aguilla.	The text/figure updates reflect field protocol more accurately. The datasheets and field guides were originally in an Appendix and were moved to SOP so they could be revised more easily. Complete ID guide.	1.0
1.02	6/3/2024	Kim Weisenborn	Updated datasheet.	Datasheet had been updated.	1.01

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, identify paragraphs and pages where changes are made, who approved the revision, and the reason for making the changes along with the new version number.

Purpose

This SOP describes conducting a visual snorkeling survey for fish and shrimp using a quadrat sampling design. This SOP will be used in Guam at WAPA. Shrimp net surveys are described in [SOP #18 Shrimp \(uhang\) Net Surveys in Guam](#), and the general procedure for setting up a site and the order of surveys at WAPA are described in [SOP #10 Conducting Surveys in Guam](#).

Overview of Sampling Procedure

This procedure must be done first before other observers enter the water to minimize disturbance to fish prior to sampling. Sampling moves from downstream to upstream. A total of ten quadrats per reach will be surveyed. With two available observers, two observers will conduct surveys simultaneously, one sampling six quadrats and the other sampling four quadrats. With one observer available, the observer moves upstream to sample all ten quadrats. Observer(s) identify and size/count all fish and shrimp in the quadrat in three minutes. The [datasheet](#) and [species identification guide](#) are included below.

Conducting a Visual Survey for Fish and Shrimp

Within each reach ten random number pairs are generated using the Cartesian coordinate system. The Y coordinate represents the distance in meters upstream between 0 and 30 (see Table SOP 17.1). The X coordinate varies between 0 and 10 and represents distance across the stream as a percentage (1 = 10%, 2 = 20%, etc.). This is done to avoid over sampling the edges of the stream. Coordinates should be ordered (Y, X) starting with Y = 0 to facilitate movement upstream. When facing upstream, 0 begins on the left bank. For example, a quadrat location of (4, 2) would be paced four meters upstream and 20% across the stream from left bank. To begin the survey, an observer unobtrusively paces off the meters to the appropriate quadrat location. Always approaching from downstream, the observer carefully and quietly lowers into the water and, using mask and snorkel, moves slowly toward the quadrat location. A one-meter-long thin metal wire is used to determine the exact boundaries of the quadrat. The observer should lie as still as possible for two minutes prior to beginning the survey in order to allow fish and shrimp to return to the quadrat. The observer records all fish and shrimp within the quadrat during a three-minute time period, noting species and size (total length from tip of nose to tip of tail) in cm for fish and prawns (*Macrobrachium lar*). For atyid shrimp, the observer simply tallies the number of shrimp since they tend to be very small and all the same relative size. For prawns and atyid shrimp, the observer should note whether the shrimp was gravid (carrying eggs) (yes, no, or unknown). Eels (asuli) as well as introduced fish should also be identified, sized, and noted on the datasheet. Observer then proceeds to the next coordinate location by snorkeling slowly through the water. Repeat procedure until all ten locations have been sampled.

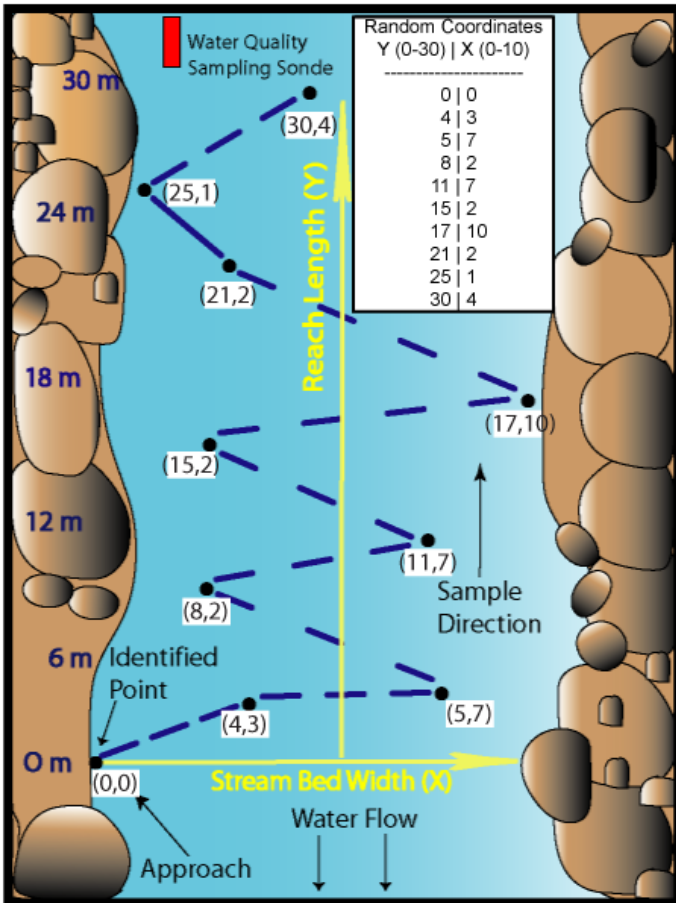


Figure SOP 17.1. Conducting fish surveys in Guam.

Introduced Species

Both native and introduced species should be noted within a quadrat. Additionally, if an introduced species is seen in the stream, but is not in a quadrat it should be identified and noted on the datasheet in a separate location. In general, introduced fish should be collected and removed from the stream. If the species is not previously known from that area it should be vouchered. If an introduced species is not able to be identified observers should catch the specimen for expert identification.

Species Identification Guide for Guam

Table SOP 17.1. Guam fish identification guide.

 <i>Stiphodon sp.</i>	 <i>Sicyopus sp.</i>	 <i>Sicyopterus lagocephalus</i> (Photo: Brent Tibbats Used by permission)
 <i>Eleotris fusca</i>	 <i>Awaous guamensis</i>	 <i>Kuhlia rupestris</i>



Stenogobius sp.



Anguilla sp.

WAPA FISH AND SHRIMP DATASHEET

Site:	Date:
Observer:	

Quadrat Number:
 Quadrat Location: X: Y:
 Record Sizes in cm

Habitat Type:
 Structure:
 Depth (m):

<i>Sicyopus</i>	<i>Stiphodon</i>	<i>Sicyopterus</i>
<i>Kuhlia</i>	<i>Macrobrachium lar</i>	<i>Awaous</i>
Other (e.g., Eleotris, etc.)		
Quadrat Notes:		

Quadrat Number:
 Quadrat Location: X: Y:
 Record Sizes in cm

Habitat Type:
 Structure:
 Depth (m):

<i>Sicyopus</i>	<i>Stiphodon</i>	<i>Sicyopterus</i>
<i>Kuhlia</i>	<i>Macrobrachium lar</i>	<i>Awaous</i>
Other (e.g., Eleotris, etc.)		
Quadrat Notes:		

Habitat Type: Abandoned Channel (AC), Backwater (BW), Boulder Riffle (BF), Cascade (CA), Chute (CH), Eddy (ED), Falls (FA), Glide (GL), Plunge-pool (PL), Pool (P), Rapid (RD), Riffle (RF), Run (RU), Sheet (SH), Not Applicable (NA)

Structure: Algal Mat (AM), Bedrock (BD), Filamentous Algae (FA), Leaf Pack (LP), Manmade Structure (MS), Rocks (cobble-to-boulder sized) (RK), Root Wad (RT), Vegetation (VG), Woody Debris (WD), No structure present (NONE), Sand (SD), Silt (ST)