WDFW Intertidal Forage Fish Spawning Habitat Survey Protocols

Procedures for recovering "winnowed light fractions" subsamples of forage fish egg-sized material from bulk beach substrate samples

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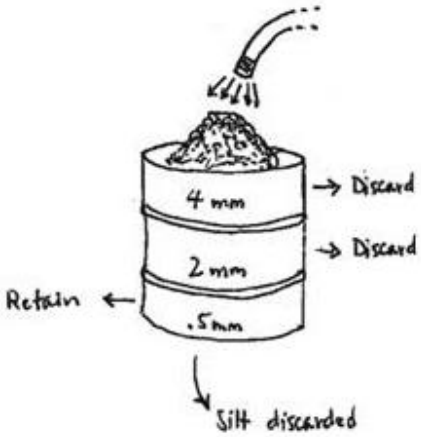
Field materials needed:

Nested set of 4-mm, 2-mm, and 0.5-mm sieves/screens (Nalgene or stainless steel preferred over brass, for durability)
Buckets for discarded material (2-4), may have several large holes drilled near lip as rinse water outlets
1-2 gallon plastic dishpans
400-ml wide-mouthed sample jars
Freshwater hose work area with sufficient drainage (or extra buckets for saltwater rinsing)
Area to discard waste gravel
Ethyl alcohol or Stockard's solution[†] (only needed when samples will not be analyzed immediately)
Pencil and Rite-in-the-Rain paper (cut into small squares for labeling samples)

Procedure:

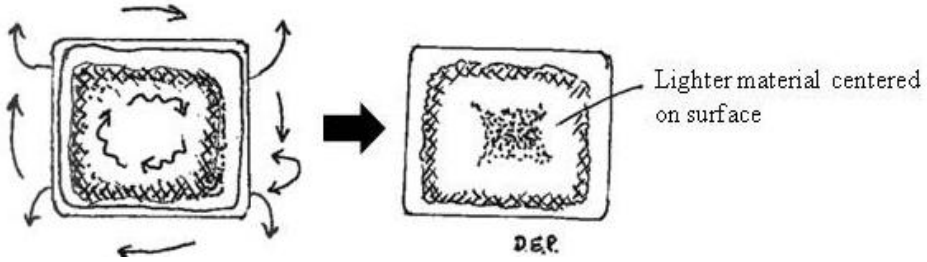
1. Thoroughly wet-screen material through set of 4-mm, 2-mm, and 0.5-mm sieves/screens, using buckets of shore-side water at site or freshwater hose elsewhere. Screens should be carefully cleaned between samples.



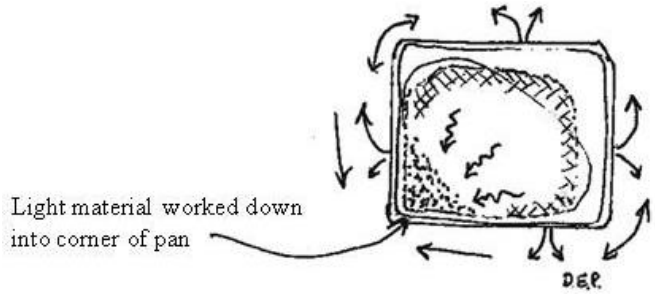
2. Discard material retained in 4-mm and 2-mm sieves/screens.

3. Place material from 0.5-mm sieve/screen ("egg-sized material") in rectangular dishpan and cover with ~1 inch of water.

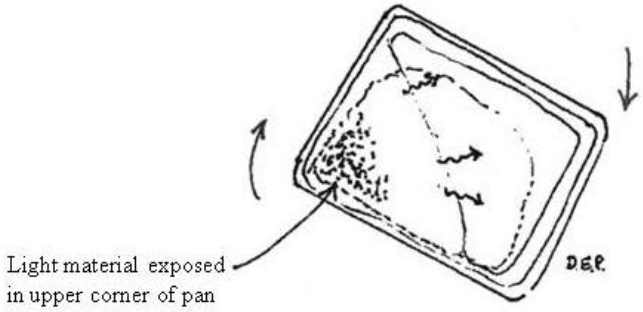
4. Rotate/tilt/yaw dishpan of material to impart rotation to water and cause lighter material to rise to the surface, where it should accumulate toward the center of the pan. Observe behavior of shell fragments and organic particles to get indication of behavior of forage fish eggs.

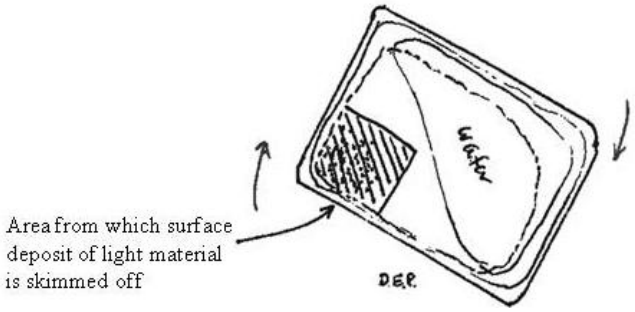


5. Tilt/swirl/agitate pan contents to move lighter material accumulated at center down to lower left corner of pan.



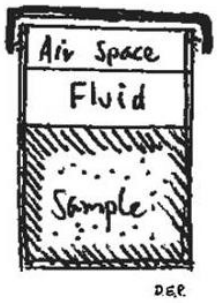
6. Carefully tilt pan to decant water to opposite corner of pan, slowly exposing lower left corner material above water's surface.





7. Holding pan in the tilted position, carefully use a wide-mouthed sample jar to skim the surface 1 inch of material from the lower left corner of the deposit.

8. Repeat steps 4-7 approximately three more times, or until the sample jar is ~⅔ full of material.



9. If sample will not be analyzed within a few days in the laboratory, top-off sample jar with ethyl alcohol or Stockard's solution[†] and shake well to distribute fluid. Note that long-term storage is also possible with these preservatives. If genetic samples are desired 95% nondenatured ethyl alcohol should be used.

10. Fit lid loosely onto sample jar to allow gas to escape (preserved samples will emit carbon dioxide as the acidic preservative dissolves shell material in the sample).

11. Store sample jars in leak-proof containers in well-ventilated area to prevent accumulation of carbon dioxide in enclosed areas. Note: both gas and some preservative, if present, will escape.

[†] Stockard's solution contains formaldehyde, which is carcinogenic. 1 l Stockard's solution = 50 ml formalin (37% aqueous formaldehyde), 40 ml glacial acetic acid, 60 ml glycerin, 850 ml fresh water (1 l = 0.2642 gal; 1 gal = 3.785 l).

Original protocol by Dan Penttila, WDFW. Reformatted by Dayv Lowry, WDFW.