Pelagic Invertebrate Standard Operating Procedures

USGS Western Ecological Research Station SFBE & Nisqually Indian Tribe

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Purpose/Objective:
Neuston net tows are used to quantify the availability of prey organisms within the water column for fish predators. This sampling is paired with fyke net surveys for fish.

These protocols provide information on sample collection, sieving and preservation. After preservation, samples will be sent to a qualified invertebrate laboratory for sorting, identification, enumeration and weighing for dry biomass. If you decide to sort and identify in-house, refer to the *Invertebrate Lab Manual* (USGS 2010).

Equipment:
Neuston net with attached cup (153µm)
1 container with lid
70% ethanol/rose-bengal solution (careful, read MSDS)
Tweezers
Spoon
Datasheet

Methods:
Collection

1. Samples are collected upstream of fyke net fish sampling sites monthly during outmigration season (March – August).

2. Samples are collected by dragging a neuston net along the surface of the water column within the tidal slough.

3. Take care that the entire mouth of the net is within the water column.

4. Collect three samples throughout the outgoing tide and pool contents into one composite sample.

5. Label sample with project name, sample ID, collection date, collector initials, date and number of samples collected.

6. Preserve sample in a 70% ethanol/rose-bengal solution.

7. Use handheld multi-probe to measure water quality (temperature, salinity, dissolved oxygen, and conductivity) readings at each sampling station. Take two water quality readings. One just below the surface of the water, and the second just above the sediment surface. If the water is too shallow (i.e. < 1 m), take a reading in the middle of the water column.

How to Make Rose Bengal 70% Ethanol Solution

$C_i * V_i = C_f * V_f$

$0.95 * V_i = 0.70 * 4{,}000$ mL

V_i = 2947 mL of 95% EtOH
4000 mL (V_f) – 2947 mL (95% EtOH) = 1,053 mL of DI H_2O
So, add:
2,947 mL of 95% Ethanol
1,053 mL of distilled water
Small spatula of Rose Bengal

Sorting and Identification

After preservation, samples will be sent to a qualified invertebrate laboratory for sorting, identification, enumeration and weighing for dry biomass. If you decide to sort and identify in-house, refer to the *Invertebrate Lab Manual* (USGS 2010) for details on sorting and identification.

When monitoring is focused on invertebrates as prey resources, invertebrate identification to the lowest taxonomic level, although informative, may not be cost effective to answer questions based on prey resources. Rather, the taxonomic categories of interest should consider the known diet of predators of interest and their foraging modes or behavior.

Data Entry and Analysis:

Abundances from samples will be standardized to area and reported as average density of invertebrates per volume of water. Pelagic invertebrate data can be used in multiple analyses. Examples include:

1. Analyzing change in insect composition over time in regards to restoration actions.

2. Comparison of restoration invertebrate composition to reference sites (Figure 1).

3. Correlation analysis between invertebrate composition and environmental variables (i.e. water quality).

4. Calculation of available prey resources to fish and avian communities.

5. Use in fish diet analyses when fish diet data has been collected (i.e. percent similarity indices between stomach contents and available prey resources).

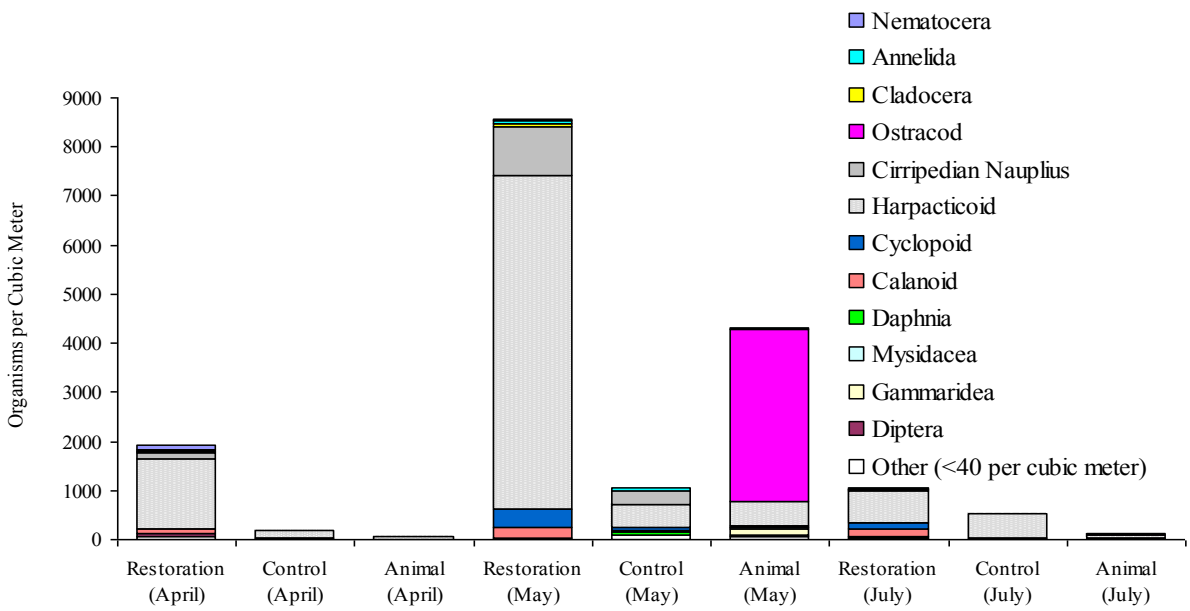

Figure 1. Density of invertebrates at Restoration, Control, and Animal monitoring sites from March, May, and July 2005, Nisqually estuary (Ellings and Hodgson 2007).

References:

Ellings, C.S. and S. Hodgson. 2007. Nisqually Estuary Baseline Fish Ecology Study: 2003-2006. Nisqually National Wildlife Refuge and Nisqually Indian Tribe, Olympia, Washington.

US Geological Survey. 2010. Invertebrate lab manual. Unpublished benthic invertebrate sieving and sorting protocols. USGS, Western Ecological Research Center, San Francisco Bay Estuary Field Station, Vallejo, CA.

Pelagic Invertebrate Sampling Form

Neuston Net Tows

Instructions: Collect three samples throughout the outgoing tide and pool contents into one composite sample.

Site Name_____ **Observers_____**

Sample Code	Sample#	Date Collected	Time Collected	Notes
N/A	1			
N/A	2			
N/A	3			
	Composite	N/A	N/A	

Water Quality

Instructions: Dissolved oxygen should be calibrated before each measurement as barometric pressure can change throughout the day. Record the dissolved oxygen reading of the instrument before and after the calibrations made at the start and end of the day. These data will serve as a quality control measure if there are problems found with the measurements.

Pre-Survey Dissolved Oxygen Calibration		
Date:	Time:	Obs:
DO% Before:	DO%After:	

Location:
Time:
Circle one: surface/bottom/middle

Temp °C	
Barometric inHg	
DO%	
DO mg/L	
Spec. Cond µS	
Cond µS	
Salinity ppt	

Comments:

Post-Survey Dissolved Oxygen Calibration		
Date:	Time:	Obs:
DO% Before:	DO% After:	

Location:
Time:
Circle one: surface/bottom/middle

Temp °C	
Barometric inHg	
DO%	
DO mg/L	
Spec. Cond µS	
Cond µS	
Salinity ppt	

Comments: