

## PROTOCOL MODIFICATION FORM

**Project Name:** Portland Harbor PDI Studies, 2018, Fish Tracking Study

**Field Modification Number:** Fish Tracking FSP Modification 01:20180504

**Material to be Sampled:** Fish scales

### **Standard Procedure for Field Collection and Laboratory Analysis (Acoustic Fish Tracking Study Field Sampling Plan (FSP), Agency Approval Draft, March 30, 2018):**

Prior to being placed in the electronarcosis system, each SMB will be photographed (SOP-02, Digital Camera Use and Documentation Procedures) and have scales removed for age dating. Scales will be removed from the area posterior to the pectoral fin and slightly below the lateral line (DeVries and Frie 1996); scale samples will be placed in wax paper, and placed in a coin envelope with the sample date and associated sample identification number clearly written on the outside of the envelope.

DeVries, D. R., and R. V. Frie. 1996. Determination of Age and Growth. Pages 483-512 in B. R. Murphy and D. W. Willis, editors. Fisheries Techniques, second edition. American Fisheries Society, Bethesda, Maryland. 732 pp.

### **Reason for Change in Field Procedure or Analysis Variation:**

In order to maintain study fish in optimal condition such that upon release following surgery they exhibit normal behavior and survive for at least one year, and considering the amount of handling, stress, and invasive procedures occurring for each study fish, the Fish Tracking Study field team decided to minimize any stressful/invasive activities that could compromise the primary objectives of the fish tracking study. This decision was also based on the fact that several fish collected were close to the minimum size threshold (228 mm); smaller fish do not handle stress/invasive activities as well as larger fish. The objective of removing scales from each study fish is to understand the age structure of the tagged sample (age dating); growth characteristics throughout the life of each study fish can be determined from scale analysis. However, understanding the tagged sample age structure is not a key element of the study. The decision not to remove any scales was also informed by the knowledge that other methods are available to the project that would provide comparable information and data; employing one or more of these methods will eliminate an unnecessary stressful/invasive procedure to tagged samples. Other methods include:

- Length frequency distribution analysis: this analysis will plot all lengths of study fish, and show several peaks or modes. Each peak will represent a cohort (age class) and the analysis will allow for the determination of length range for each cohort. The only data needed to conduct a length frequency distribution analysis is length data from each tagged fish, and these data are being collected. In addition, lengths from fish from other studies could also be brought into this analysis which would increase sample sizes and reduce confidence intervals.

- Fish euthanized and dedicated to the Fish Tissue Study: During the Fish Tracking Study, a number of fish have been euthanized. As discussed in the FSP (pp. 2 and 16), these fish have been saved with the intent of dedicating them to the Fish Tissue Study scheduled for August/September. As of Thursday May 3, the length categories of tagged fish mirror the fish that have been euthanized. Therefore, scales from euthanized fish can be used to determine the age structure and growth characteristics of the tagged sample. The otoliths can also be extracted from the euthanized fish and used to perform a supplemental analysis of fish age and growth.

**Variation from Field or Analytical Procedure:**

Use of scales and otoliths from the euthanized SMB and the length frequency analysis for the tagged fish are proposed for meeting the study objective of understanding age structure of the tagged SMB study population. This procedure is consistent with the FSP, and minimizes invasive/stressful procedures to tagged study fish. Ultimately this modification will increase post-release survival and normal behavior of tagged study fish, and contribute to the success of the Fish Tracking Study.

**Special Equipment, Materials or Personnel Required:**

Special equipment, materials, or personnel are not required for this Protocol Modification.

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