

**STANDARD OPERATING PROCEDURES  
FOR BASELINE MONITORING OF MARINE  
SHELLFISH AQUACULTURE IN NOVA  
SCOTIA**



**Fisheries and Aquaculture**

**Spring 2021**

## 1 INTRODUCTION

The *Standard Operating Procedures for Baseline Monitoring of Marine Shellfish Aquaculture in Nova Scotia* describes the baseline monitoring methodologies for the Nova Scotia Department of Fisheries and Aquaculture (NSDFA) Environmental Monitoring Program (EMP). Marine shellfish farms in Nova Scotia are required to comply with the EMP as outlined in the Aquaculture Management Regulations (AMRs) under authority of the *Fisheries and Coastal Resources Act*. Baseline environmental monitoring on marine shellfish aquaculture leases under review in Nova Scotia must adhere to the monitoring instructions and reporting requirements outlined in this document. This document and the methodologies described within will be reviewed annually to include changes and innovations to collection methods, technologies, and regulatory approaches. Marine shellfish farm operators are responsible to adhere to these requirements, coordinate monitoring as instructed, and provide data to NSDFA.

Any questions related to this document should be directed to Aquaculture Operations at (902) 875-7436 or [EMPSupervisor@novascotia.ca](mailto:EMPSupervisor@novascotia.ca).

## 2 BASELINE MONITORING

Baseline data collection is required in the following situations:

- The establishment of a new lease;
- The establishment of an experimental lease;
- Reactivation of a lease; and
- Amendment of the boundaries of an existing lease.

Collection of appropriate and complete baseline data provides information on the current environmental conditions of a lease area. The primary means of evaluating these environmental conditions will be through the collection of benthic video recordings. Video collection is a cost-effective and appropriate method to successfully determine benthic habitat conditions within a proposed or existing marine shellfish aquaculture lease area. The following sections outline the information to be collected and methodologies used to meet the NSDFA requirements for marine shellfish baseline monitoring.

### 2.1 PRE-MONITORING MEETING

Before collecting baseline information for a proposed lease area, NSDFA must be contacted to discuss the sampling plan. In cases where the lease is of an irregular shape or equal transect spacing is not obvious or possible, NSDFA will provide guidance on a suitable sampling plan. The applicant will need to provide NSDFA with a list of monitoring equipment that will be used such as video camera, lighting, frame, and GPS.

## 2.2 SHELLFISH BASELINE MONITORING REQUIREMENTS

For a typical marine shellfish lease, the minimum baseline monitoring requirements will consist of the following (Figure 1):

- Video recording of the seafloor at each corner of the proposed lease boundary; and
- Video recording of the seafloor conducted along three, equally spaced transects, each running the entire length of the proposed lease boundary.

In addition to the minimum requirements listed above, any sensitive or important habitat identified during the baseline monitoring survey must have the boundaries delineated to determine the extent of the habitat within the proposed lease boundary. Examples of sensitive or important habitat includes eelgrass beds, large/extensive macrophyte beds such as kelp, dense aggregations of shellfish, or known spawning habitat.

It is recommended for all video recordings relevant to a baseline monitoring event be carried out on the same day.



**Figure 1: Example of baseline monitoring station and transect locations for a typical marine shellfish site.**

### 2.2.1 Video Station Recording Methodology

Video may be recorded via surface deployed drop camera, hand-held diver operated video camera, or remotely operated vehicle. The criteria for acceptable station video recording are described below:

- A placard containing relevant video station details (date, time, coordinates, lease number and station ID) must be presented at the beginning of each video recording, prior to submersion.
- A 360° panorama of the water surface view plane must be recorded at each video station prior to submersion.
- A GPS displaying the coordinates must be shown at the start of each video. Note: GPS coordinates overlaid on the recorded video is preferable, but not required at this time.

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SHELLFISH BASELINE MONITORING

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- The video must include continuous footage of the camera's initial descent, impact with the seafloor, hovering over seafloor area, ascent, and retrieval on deck. This continuous footage should also include video footage of the placard, 360° panorama, and coordinates prior to submersion.
- Once near bottom, the camera's decent will halt above the seafloor. Demonstration of sediment consistency will then take place via camera or diver contact with the sediment.
- Video for each monitoring station must cover a minimum area of 5 m<sup>2</sup>.
- A minimum 2 minutes of seafloor footage are required at each video station.
- It is recommended for the field of view to include a visible reference scale; and
- It is recommended for video collection to be conducted between July 1st and October 31<sup>st</sup>.

### 2.2.2 Transect Video Recording Methodology

As indicated in Section 2.1, video recordings conducted along transects located within the proposed lease boundary are required. The transect can be either continuous video footage, or stations established along the length of the transect at a pre-determined interval (e.g., every 25 m). The type of transect suitable for the lease area will be determined when discussing the sampling plan with NSDFA. The criteria for acceptable transect video are described below:

#### Continuous Transect Video:

- A placard containing relevant transect details (date, time, starting coordinates, lease number and transect ID) must be presented at the beginning of each video recording, prior to submersion.
- A 360° panorama of the water surface view plane must be recorded prior to submersion.
- A GPS displaying the coordinates must be shown at the start and end of each transect. Note: GPS coordinates overlaid on the recorded video is preferable, but not required at this time.
- The video must include continuous footage of the camera's initial descent, impact with the seafloor, hovering over seafloor area, camera ascent and retrieval on deck. This continuous footage should include video footage of the placard, 360° panorama, and coordinates prior to and after submersion.
- Once near bottom, the camera's decent will halt above the seafloor. Demonstration of benthic consistency will then take place via camera or diver contact with the sediment.
- Following demonstration of sediment consistency, the controlling vessel, diver or ROV will navigate the length of the transect, maintaining a clear view of the seafloor throughout.
- It is recommended for the field of view to include a visible reference scale.
- It is recommended for transect video collection to be conducted between July 1st and October 31st.

#### Station Transect Video:

- If acceptable transect video cannot be collected for technical or environmental reasons, single point video recordings may be collected at stations along the length of the original transect. NSDFA will provide guidance on station positioning along the transect during the pre-monitoring meeting. Recordings at all transect video stations along the transect must meet all criteria listed in Section 2.2.

### **3.0 VIDEO QUALITY REQUIREMENTS**

The video camera should be positioned in a manner vertically above the seafloor and operated at an appropriate speed so that video image quality, and lighting, is sufficient to recognize and identify substrate type, condition, and any marine flora or fauna in the area.

These unedited videos must be submitted to NSDFA to be shared with network partners for review of the respective application. If any video submitted to NSDFA does not meet the video quality requirements, it may not be accepted, and the proponent will be asked to re-collect the video footage.

### **4.0 VIDEO SUBMISSION**

Baseline video should be submitted to the NSDFA Aquaculture Operations Section (see below) as part of the related application package (new lease, boundary amendment or reactivation).

An electronic copy of the completed checklist (Appendix A) and video files can be sent to Aquaculture Operations via our secure file transfer system upon request. Requests can be made by email to [EMPSupervisor@novascotia.ca](mailto:EMPSupervisor@novascotia.ca). Please title your email “Shellfish Baseline Submission”.

OR

Physical copies of the completed checklist (Appendix A) and video files can be sent to the attention of Aquaculture Operations at the following mailing address:

Aquaculture Operations  
Nova Scotia Department of Fisheries and Aquaculture, Aquaculture Division  
1575 Lake Road  
Shelburne, Nova Scotia  
B0T 1W0

## APPENDIX A

### Checklist for Shellfish Baseline Monitoring

- NSDFA has been contacted to discuss the Baseline Sampling Plan
- NSDFA has been provided with a list of monitoring equipment that was used such as video camera, lighting, frame, and GPS.
- Video of the seafloor has been collected at each corner of the lease area under review
- Video of the seafloor has been collected along three, equally spaced transects, running the entire length of the lease area under review
- A placard, containing relevant video station/transect details (date, time, coordinates, lease number and ID) is shown at the beginning of each video
- A GPS displaying the coordinates is shown at the start (and end for continuous transects) of each video
- A 360° panorama of the water surface view plane has been collected at the beginning of each video, prior to camera descent into the water
- Demonstration of seafloor consistency at each station or transect has taken place via camera or diver contact with the sediment.
- The video camera is positioned in a manner vertically above the seafloor and operated at an appropriate speed so that video quality, and lighting, are sufficient to identify substrate type, condition, any marine flora, or fauna in the area
- A minimum of two minutes of seafloor footage is recorded at each station
- An electronic or hard copy of complete videos is sent to NSDFA
- An electronic or paper copy of signed checklist is sent to NSDFA

By signing this document, I verify that I have completed the above checklist.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_