

# GUIDE TO BEST MANAGEMENT PRACTICES



Revised September 2024

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The Regional Shellfish Seed Biosecurity Program (RSSBP) Hatchery Compliance Program is designed around Best Management Practices, providing tools to improve, document and support facility disease risk management. These BMPs are further explained below.

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## **1. Water treatment to prevent pathogen exposure during early life stage cultivation should employ a series of filters to get to 1 µm filtration, or demonstrate another means to minimize the risk of pathogen exposure from source water (e.g., pasteurization, well water, etc.).**

Source water will differ among facilities in sediment, biological loads and other factors. Water quality also varies seasonally, and with events such as storms and algae blooms. This means water treatment requirements may also change over the course of a season. There are also physical considerations such as the distance source water travels to the facility and the volume of water being pumped that may impact treatment effectiveness or efficiency. Therefore, there is no 'one size fits all' approach to water treatment. While facilities will differ in how this is achieved, the requirement is to demonstrate that water used for larval and early post-set cultivation has been adequately filtered to 1 um or otherwise treated (e.g., pasteurized) or sourced (e.g., well water or artificial sea water) to minimize pathogen exposure.

Auditors will 'follow the water' – starting where it enters the facility and following the path as it moves through filtration or treatment and to the different production systems, looking for clear separation of treated and untreated water.

## **2. Adequate separation of untreated and treated water to avoid cross contamination is required which includes physical separation of areas, water drainage, equipment, workflow, and cleaning.**

The key is avoiding the spray/splash/aerosol transfer or tracking of untreated source water (a.k.a. raw water or ambient water) into areas of treated water culture (algal, larval and post-set systems). Options differ in level of sophistication and some may look nicer, but the methods are demonstrated to be effective by health evaluations showing the products are routinely free of disease, and Pathogens of Concern (POCs) are undetectable.

**2-a. Physical separation of areas- Adult animals**, i.e., broodstock, should be segregated from algal, larval, and post-set culture systems within the hatchery. If applicable, quarantine practices must be demonstrated for all non-local endemic species of broodstock.

There is no 'one-size fits all' approach to broodstock segregation. The key for biosecurity is to contain untreated or minimally- treated source water housing large animals, away from areas of treated water culture (algal, larval and post-set systems).

There are a couple of options, depending on the facility space:

- Broodstock is held in a separate room or in a completely separate building.
- Broodstock tanks are on one side of the hatchery with a distance of several feet or more from treated water production areas to avoid contamination from splashing or aerosols.
- In cases where the physical distance is limiting, plastic curtains or similar can be hung between the areas as a physical barrier to protect against aerosol contamination.

In addition, a plan needs to be in place for moving broodstock in and out of treated water areas for spawning without dripping untreated water on the floor where it could be tracked to the treated water production areas.

**2-b Water drainage** - Untreated water drainage must be contained/diverted in some manner (floor drains, etc.) to avoid spilling out on the floor where it could easily come in contact with clean equipment (hoses, buckets) or be tracked throughout the facility.

**2-c. Equipment** - Equipment should be assigned to specific operational areas (e.g., containers used to transport adult animals, should be used only for such tasks) or effectively sanitized between uses when shared.

- Use designations for equipment such as buckets, sieves, hoses, etc. should be readily identifiable - in a separate building/room or labeled for a specific task or production area. For shared equipment, a sanitation protocol should be implemented.

**2-d. Workflow** - Workflow and operational plans should be designed to prevent the introduction of raw water and contaminants from entering areas where cultivated life stages are in treated water.

- Each facility should have a plan in place that ensures POCs are not being transferred from staff working with untreated source water to the clean/treated production areas. Transfers can be from staff hands, arms,

clothes, aprons, shoes, or equipment that have come in contact with untreated source water.

- Plans will depend on the size of the facility, number of staff, and general operations. Examples of elements that should be considered:
  - Functional separation of workers - workers are assigned to perform tasks separately. For example, maintenance of broodstock is conducted separately from larval cultivation without switching back and forth as every switch requires cleaning and decontamination increasing the risk of transfers. This could be on a full-time, or daily basis.
  - Assigning tasks that involve working with untreated source water (field/nursery/broodstock) to the end of the day after staff have finished in the treated production areas. This may be more realistic for smaller operations with limited staff.
  - Designating particular gear (aprons, boots, etc.) for staff working with untreated source water which will only be worn during these tasks and doesn't leave the untreated area.
  - Implementing cleaning/disinfecting procedures for entering treated production areas such as washing hands/arms, using disinfectant shoe baths.
  - Conducting staff training on the importance of separating untreated source water and treated water with the purpose of not introducing POC/disease. Training frequency depends on numbers of staff and turnover rates. Training could be informal – a seasonal staff meeting / review [rssbp.org](http://rssbp.org) - or be a more formal training program with a manual of printed Standard Operating Procedures (SOPs).
  - Posting signs and/or restricting access to treated production areas to minimize traffic through these areas.

**2-e. Cleaning** - Cleaning of water filters or other water treatment apparatus should be conducted in an area separate from treatment areas or any areas containing treated water to avoid cross contamination.

### **3. Records should be kept for broodstock, spawning, and maintenance of systems used to eliminate POCs.**

Records can be physical (paper) or digital. The importance is to help determine the source of problems when they occur. Participating facilities must demonstrate record retention and ensure frequency of record keeping. The auditors will want to see the

notebooks.

**3-a. Broodstock records** must be maintained and document source location (source water), genetic background, and collection date. If applicable, quarantine practices must be documented for all non-local endemic species of broodstock.

- Records should be available and maintained for all broodstock batches that identify the number of individuals, the species, and source, which should indicate if it is wild or selected and the specific origin.
- An example of the level of detail auditors will be looking for: "NJ" or "VA" is not adequate, but "Rutgers Cape Shore facility - Lower Delaware Bay" or "Virginia Institute of Marine Science- Yorktown, VA – Lower York River", is adequate).
- A quarantine protocol should be on hand for any facility handling non-local broodstock.

**3 - b. Spawning records** must be maintained that document the specific broodstock used from the broodstock records, spawn code/name, and date spawned in order to accommodate any trace back from health certification results.

**3-c. Maintenance Records should be kept indicating maintenance of systems to eliminate POCs from source water (e.g., filter change regimes, relative "age" of all active filters).**

- Labels on equipment indicating maintenance are strongly recommended to alert all staff of needs.
- While maintenance needs will differ among facilities and across seasons, every facility should have a standard operating procedure in place that is specific to their needs and **record** individual equipment inspections to ensure equipment is functioning as desired. Standard operations should record details such as:
  - The maximum number of days / passes before equipment is cleaned
  - A number of cleanings before filters are replaced
  - Backwashing schedules for the appropriate filtration systems and a schedule of when media are replaced.
  - UV filtration should include monitoring and a bulb replacement schedule.
  - Testing data where applicable

#### **4. Health examinations should be conducted on animals experiencing unexplained, atypical mortality and records kept.**

This maintains the Program's ability to stay alert to possible emerging pathogens and POCs. The Shellfish Health Advisory Council must be notified of any disease issues that come up during Program participation including any actions taken to rectify the situation.

Facilities should develop a relationship with an RSSBP-approved shellfish pathologist. Larval mortality is complex and can be attributed to a number of factors that may or may not involve pathogens of concern (POCs). In cases where there is not an obvious reason for mortality (a pump failed, or not enough feed, etc.), a sample should be sent for testing to rule out a POC/disease issue. Sending samples doesn't count against operators, rather it demonstrates appropriate biosecurity measures are in place. Ruling out POCs/disease is critical to mitigate product loss and disease spread.

#### **5. All Federal, State and Local permitting requirements such as obtaining hatchery facility permits, must be followed.** Non-compliance with permitting requirements will result in removal of the hatchery from the RSSBP.

Rules vary and not all facilities will require permits. The hatchery operator is responsible for obtaining all required Federal, State or Local permitting and is acknowledging compliance by signing the application/renewal form. The Auditors will ask the hatchery operator whether or not permits are required, but the auditor is not responsible for verifying this information.