

# BEST MANAGEMENT PRACTICE RECOMMENDATIONS

for Aquatic Invasive Species Early Detection and Decontamination in  
Fish Rearing and Holding Facilities



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## **Executive Summary**

The transport of live fish can be a significant pathway for the movement of aquatic invasive species (AIS). This includes live fish cultivated in private, state and federal hatcheries and aquaponics facilities for stocking in public and private waters or use as live bait or as food fish. To address this issue, western states recognize the need to establish basic best management practices (BMP) for AIS inspections in fish rearing and holding facilities. BMP's were also developed to address AIS detections in a facility and measures to mitigate AIS movement out of the facility.

Other resources that provide guidance for addressing AIS in hatchery systems includes the USDA Comprehensive Aquatic Health Program Standards and the State of Arkansas live bait certification program. Hazard Analysis and Critical Control Point (HACCP) plans also should be established for each facility to address introduction of disease and AIS. Plans should be reviewed regularly to ensure they are up to date and are following current protocols.

The guidelines in this document were developed in collaboration between the Western Invasive Species Coordination Effort (WISCE), Western State AIS Coordinators, Hatchery Managers and Fish Health Coordinators, with a goal to provide basic guidance on how to conduct AIS surveillance at hatcheries, reduce the risk of spreading non-target organisms and recommend strategies to address AIS in hatchery facilities following detection. These recommendations were reviewed and supported by many western fish chiefs through the actions of the Western Association of Fish and Wildlife Agencies (WAFWA) Fisheries Committee. Appendix A was presented at WAFWA's 2024 Summer Annual Meeting in Stevenson, Washington.

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## **Section I: Introduction**

AIS and fish pathogens are typically regulated by state departments of agriculture or fish and wildlife. Individual states regulate fish transport and regulating agencies may have additional standards or requirements beyond these BMPs based on biosecurity and other risk factors. Consult your state AIS program for more information.

## **Section II: Hatchery Inspection and Survey**

Comprehensive AIS hatchery inspections should include the following annually, where appropriate:

1. Surveys must be conducted by qualified staff who are trained and approved through the state AIS program. The state AIS program will maintain a list of individuals who are qualified to conduct AIS hatchery inspections.
2. Hatchery inspections should be conducted at a time of year when water conditions are most conducive to identifying presence of AIS.
3. Conduct a thorough visual inspection of the facility and water source looking for the presence of plants and invertebrates including: snails, clams, mussels, crayfish and other potential invasive species.
4. Conduct kick net and/or scrape surface sampling throughout the facility focusing on areas that have an elevated probability of containing AIS including the outlet of the hatchery, raceways, ponds, water sources, filters and screens. Coordinate with hatchery staff to help identify potential areas to sample.
5. Sample utilizing plant rakes to access areas where plants cannot be otherwise sampled.
6. Install sampling substrates or bioboxes in the facility to improve AIS detection during future sampling events.
7. If appropriate, deploy crayfish traps to detect the presence of invasive crayfish.
8. Collect voucher specimens of species found and identify all suspected AIS to species. If possible, identify all native species to family / genus.
9. Record sampling and survey information including methods used, locations sampled and species observed.
10. The hatchery should maintain a list of sources the facility utilizes for fish at the station (records to be maintained by hatchery). If suspected AIS are identified, record dates and sources of all fish deliveries since the previous inspection.

## **Section III: Additional Sampling.**

Additional AIS hatchery survey protocols may be required by state AIS programs to allow for live fish transport. Additional sampling may include:

1. Collection of plankton tow sample(s) for microscopic analysis for *Dreissenid* mussels, corbicula clams or invasive water fleas. Collect plankton tow samples at outflow and inflow areas, if appropriate.
  - A. For facilities that utilize open water sources, collect samples during backflushing events of in-flow screens and filters if possible.
2. Consider the use of environmental DNA (eDNA) analysis to aid in the detection of *Dreissenid* mussels, New Zealand mudsnails, corbicula clams, invasive carp, or other AIS of concern.
  - A. The presence of DNA does not necessarily indicate the presence of a live viable organism.

#### **Section IV: Decontamination.**

The following provides guidance for AIS decontamination in facilities following the detection of an AIS.

1. For facilities with hardened structures (metal, fiberglass or concrete tanks, raceways or hauling trucks):
  - A. Dewater the facility.
    - i. Dewatering should be coordinated with the state AIS agency to address possible AIS release during dewatering process.
    - ii. Areas that cannot be dewatered may be brought up to 140+ degrees F with a minimum contact time of 10 seconds to kill organisms in that area.
    - iii. Other chemical treatments may be available for areas that cannot be dewatered.
    - iv. Consult with the state AIS program for decontamination information and guidance.
  - B. Decontaminate facility surfaces with 140°F water.
  - C. Flame treat concrete areas when possible.
  - D. Allow facility to dry completely for 30 days, if possible.
  - E. Allow for freezing if possible.
  - F. Reintroduce water to facility and maintain normal operation water levels for 30 days prior to fish reintroduction.
  - G. Conduct a thorough AIS survey following the methods outlined above one month following water reintroduction.
    - i. If no AIS are detected, consult state AIS program for guidance on fish reintroduction and transport.
2. For earthen pond facilities:
  - A. Conduct eradication procedures including but not limited to desiccation, freezing, excavation and chemical treatment.

- B. Follow monitoring protocols outlined above and consult the AIS program in the state guidance on resuming fish rearing and transport.
- 3. For facilities with both hardened structures and earthen ponds:
  - A. If only a portion of a facility can be effectively decontaminated, fish transport may still be permitted following effective decontamination of that area. Consult the state AIS program to determine specific decontamination and fish transport restrictions and requirements.

### **Section V: Following Decontamination:**

When a facility has met decontamination requirements, record all decontamination and subsequent sampling activities conducted. Documentation should include: a detailed description of decontamination procedures and where they were used, where and for how long specific areas were dry; where sampling was conducted following decontamination and what sampling frequency was used.

1. Following an AIS detection, AIS inspections should be conducted a minimum of twice a year for 5 years.
2. Other considerations:
  - A. Transport and stocking of fish from AIS positive waters or hatcheries: States have varying protocols and HACCP Plans to address the transport of fish from waters where AIS have been identified. Consult state AIS programs for information on accepted methods and protocols.
  - B. Following the detection of an AIS, identify the source of AIS introduction and address that pathway through biosecurity improvements.
  - C. Investigate additional measures that can be taken to improve biosecurity and AIS prevention at fish rearing, holding and transport facilities. Consult the state AIS program to identify measures to improve biosecurity.

### **Section VI. Other Recommendations.**

1. Regularly evaluate each facility to identify opportunities to improve biosecurity.
2. Every hatchery facility is different. Develop site-specific survey plans to maximize the probability of AIS detection.
3. Only use dedicated sampling equipment (kick net, waders, plankton net) for each individual facility to prevent cross contamination.
4. All sampling equipment must be decontaminated before and after sampling according to established standards and protocols.
5. If possible, conduct hatchery inspections at times when fish are not present in raceways.
6. When possible and appropriate, enlist the help of hatchery staff to identify potential inspection areas within the facility that may not be obvious to inspection staff. This

may include asking for a detailed diagram of the facility with a clear depiction of water movement through it.

7. AIS species are present in some hatchery facilities where they cannot be removed. In these situations, individual states determine stocking considerations and requirements.
8. If AIS are verified in a hatchery facility, the hatchery owner should be notified immediately.
9. If possible, establish a decision-making body that can provide direction and guidance in the event of an AIS detection.
10. For hatchery trucks, decontaminate using established protocols. Allow to drain completely and dry if possible.
11. Limit water transfer when moving fish as much as possible including from hatchery trucks to stocking waters.
12. Transport fish in water from secure water sources when possible.