



Standard Operating Procedure Aquatic Invasive Species Decontamination

WQDWQPBFM-05, Version 1.0

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Water Quality Planning Bureau

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Although the WQPB follows this SOP in most cases, there may be situations where an alternative methodology, procedure, or process is used to meet specific project objectives. In such cases, the project manager is responsible for documenting deviations from these procedures in the Quality Assurance Project Plans (QAPPs), Sampling and Analysis Plans (SAPs), and end of project summary reports.

Document Revision and Version History

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ACRONYMS

AIS	Aquatic Invasive Species
DEQ	Montana Department of Environmental Quality
HUC	Hydrologic Unit Code
FWP	Montana Fish, Wildlife and Parks
FWS	U.S. Fish & Wildlife Service
SAP	Sampling and Analysis Plan
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
QAPP	Quality Assurance Project Plan
WQPB	Water Quality Planning Bureau

1.0 PURPOSE

This document describes the Montana Department of Environmental Quality (DEQ) Water Quality Planning Bureau (WQPB) Standard Operating Procedure (SOP) for aquatic invasive species (AIS) decontamination. AIS are a serious ecological and economic threat to Montana and include non-native fish, mussels, snails, plants and disease-causing pathogens. They can overwhelm aquatic ecosystems, outcompete or kill native flora and fauna, clog water pipes and hydropower facilities, and once established, can be costly and logistically impossible to eradicate. This SOP has adopted decontamination procedures provided by Montana Fish, Wildlife and Parks to prevent the spread of AIS when conducting surface water monitoring activities. Decontamination will consist of removing AIS from sampling equipment via a “Clean, Drain, Dry” technique and/or chemical action.

2.0 APPLICABILITY

This procedure is intended to be used for WQPB surface water monitoring activities to reduce or prevent the spread of AIS from watercraft and other related sampling equipment. These procedures are applicable to all waterbody types and are not limited by the season. The decontamination procedure should be followed whenever the sampling location occurs with a change in the waterbody and when moving downstream to upstream in the same 6th level HUC watershed.

3.0 METHOD SUMMARY

Project planning should consider any necessary AIS decontamination when setting up sampling schedules. (**Section 10.1**). Watercraft and trailer AIS decontamination should be done whenever watercraft is used. Waders and appropriate equipment should also be decontaminated whenever moving from one waterbody to another, or when moving downstream to upstream in the same 6th level HUC watershed. The recommended chemical decontamination is Virkon® Aquatic disinfectant and virucide.

4.0 DEFINITIONS

Aquatic Invasive Species (AIS): “Aquatic organisms that invade ecosystems beyond their natural, historic range. Their presence may harm native ecosystems or commercial, agricultural, or recreational activities dependent on these ecosystems” (FWS, 2020).

Vessel operator: one individual that is responsible for watercraft operations including transportation (DEQ, 2016).

Virkon® Aquatic: “A concentrated disinfectant powder that, when mixed with water forms a powerful cleaning and disinfecting solution with efficacy against a broad range of fish viruses, bacteria, fungi, and molds” (Syndel, 2020).

5.0 HEALTH AND SAFETY WARNINGS

Field personnel should be aware of job hazards associated with conducting any surface water monitoring activities that could result in personal injury or loss of life. Driving, boating, wading, and chemical safety are especially pertinent to the procedures contained in this SOP. Personnel should be aware of unstable banks, loose substrate, and swift currents when wading and standing in running water. DEQ field personnel should review and sign the WQPB Job Hazard Analysis Form and the Waterborne Operations Procedure before collecting data (DEQ, 2016).

Proper safety precautions must be practiced when decontaminating sampling equipment. DEQ field personnel should always read and be familiar with the Safety Data Sheet (SDS) of any hazardous product before handling. The SDS provides information on the chemical properties and hazards of a product, how to use a product safely, and what to do if accidents occur. Containers used for decontaminating sampling equipment must also be designated and appropriately labeled.

Virkon is corrosive in powder form and should be handled with caution. Work with the powder in a well-ventilated area with protective gloves and eye/face protection, and wash hands thoroughly after handling (LANXESS, 2020). The 2% solution that is used for field decontamination does not have the same corrosive nature as the powder, but field personnel should use protective gloves and wash their hands after the process.

6.0 CAUTIONS

It is best to purchase wading gear that has the fewest places for sediment, vegetation and organisms to attach. Wading gear consisting of rubber soles and cleats are highly recommended.

Virkon should be used only for hard surface equipment such as: waders, boots, brushes, nets, and similar equipment. It is not intended to be used for sensitive equipment such as meters, sondes, and sensors. Physical decontamination and inspection should be used for sensitive equipment.

7.0 INTERFERENCES

Failure to follow this SOP introduces the risk of spreading AIS throughout the state.

A 2% Virkon solution has a maximum shelf life of 1 week for maximum potency. This shelf life may be shorter if the solution is heavily muddied or diluted over those 7 days so it is important to minimize the introduction of silt and grit into the solution (primarily from waders and boots).

8.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

When developing a Sampling and Analysis Plan (SAP) the project manager should include a section about site sequencing and which waterbodies are AIS positive or suspected.

Field personnel must be trained by experienced personnel and must demonstrate proficiency in all applicable field protocols as described in this SOP before collecting data in the field. Field personnel should be familiar with recognizing AIS so that if any are identified it can be reported to the proper

authorities. If there is a change in the field week schedule, it is the responsibility of the field crew to decontaminate accordingly.

All watercraft and trailer decontamination procedures Section 10.3 and 10.4 should be overseen and conducted by the vessel operator.

9.0 EQUIPMENT AND SUPPLIES

Field personnel should be prepared for decontaminating any field gear and equipment whenever in the field.

9.1 WADERS, NETS AND OTHER SAMPLING EQUIPMENT

- Jug with spigot marked with “Decon Tap Water”
- Virkon® Aquatic disinfectant powder
- Powder scoop (provided with Virkon® Aquatic)
- Protective gloves
- Eye/face protection
- Container with gamma sealed lid marked with “2% Virkon”
- Stiff-bristled brush (1 per person)
- Pressurized sprayer

9.2 WATERCRAFT AND TRAILER

- Watercraft and Trailer
- Towels
- Earmuff attachment for motor (for mussel-positive or suspect waters)

10.0 PROCEDURAL STEPS

10.1 PROJECT PLANNING

When planning a sampling project, the project manager should be aware of any AIS positive and suspect waterbodies in the project area and determine the decontamination needs. The Montana Fish, Wildlife and Parks (FWP) AIS website should be consulted prior to project planning and performing field work (<http://fwp.mt.gov/fishAndWildlife/species/ais/speciesId/>).

Sampling schedules should be arranged so that field crews are ideally sampling upstream to downstream, and that any AIS-infested waterbodies are sampled last. It is important to remember that decontaminating in the field takes time (approximately 30 minutes per decontaminating event for waders, nets and other sampling equipment; and longer for watercraft and trailer decontamination). The increase in time should be taken into consideration when planning field sampling events.

10.2 WADERS, NETS AND OTHER SAMPLING EQUIPMENT DECONTAMINATION

A 2% Virkon® Aquatic solution can be effective in killing quagga/zebra mussels, New Zealand mudsnails and various fish pathogens (Stockton 2011; Stockton and Moffitt 2013; Yanong and Erlacher-Reid 2012).

10.2.1 Virkon Preparation

An appropriate amount of Virkon solution needs to be prepared for the week based on the field crew size during the field week packing. Five gallons of solution is suitable for one person, and two people should bring seven gallons of 2% Virkon solution to properly decontaminate 2 sets of waders and boots, along with a reasonable number of other field equipment items.

1. Fill a jug with 5-7 gallons of tap water in an appropriate labeled jug (i.e., “Decon Tap Water”).
2. Prepare 5-7 gallons of 2% Virkon solution in a gamma-sealed container appropriately labeled (i.e., “2% Virkon Solution”).
 - Wear protective gloves, eye protection and a face mask when making the solution.
 - Add 2.7 ounces Virkon powder per gallon of water and stir; 2.7 ounces Virkon powder = 2 scoops from manufacturer-provided measuring spoon.
3. Seal the 2% Virkon solution before travel.

Once the solution is mixed, it can be used repeatedly for up to seven days unless heavily muddied or diluted.

10.2.2 Decontaminating in the Field

All wading gear and sampling equipment must be decontaminated whenever moving from one waterbody to another, or when moving downstream to upstream in the same 6th level HUC watershed and before sampling for another trip.

1. After sampling has occurred but prior to exiting a waterbody, use a stiff-bristled brush to remove organic matter (e.g., sediment, vegetation and aquatic organisms) from waders, boots, nets and any other gear that has come in contact with the ambient water.

NOTE: Sondes, data loggers, and other sensitive sensors are excluded from being brushed and placed in the 2% Virkon solution in the field and should be physically inspected for any plant or other organic matter before leaving the waterbody.

2. Exit the waterbody and rinse all wading gear and sampling equipment with tap water using the pressurized sprayer and drain on land above the high-water mark of any nearby waterbodies.
3. Place your waders (the bottom half or whichever portion has come in contact with the water), boots, and any other sampling equipment (excluding sensitive sensors) that have come in contact with the stream (including the stiff-bristled brushes) into the container of 2% Virkon solution for a minimum of 10 minutes. Wear protective gloves and avoid contact with eyes.
4. Remove wading gear and sampling equipment and rinse with tap water using the pressurized sprayer and drain gear and equipment on land above the high-water mark.
 - 2% Virkon solution can degrade wading gear when used repeatedly. However, degradation can be reduced by rinsing with tap water.
 - Aim to have minimal amounts of 2% Virkon solution enter the environment while rinsing.

Dispose of the 2% Virkon at the end of a field week down a drain routed to a wastewater treatment plant (e.g., a drain in the laboratory). Avoid allowing excess silt and grit down the drain by filtering it out. Hang waders to dry and it is best to place a bucket or mat underneath as the Virkon solution tends to leave residue on the floor.

10.3 WATERCRAFT AND TRAILER DECONTAMINATION FOR ALL WATERBODIES

Watercraft and trailers should be inspected whenever they are launched and retrieved from a waterbody. Stop at all encountered FWP watercraft inspection stations.

- 1) Prior to leaving a waterbody, remove all plant and animal material from the watercraft, trailer, and equipment and dispose of debris in the trash or on dry land away from the launch ramp. Next, drain or remove water from the watercraft, bilge, live well, engine and internal compartments by removing drain plugs.
- 2) Prior to entering a different waterbody or storing in the laboratory, locate a self-serve (coin-operated) car wash facility with a pressurized power sprayer (FWP, 2020) or an FWP decontamination station and pressure wash the watercraft and trailer with hot water (120-140° F) until they are thoroughly clean. Pay particular attention to small spaces where organisms could hide (e.g., laces, anchor lines, and crevices). There is no need to use chemicals or soap when pressure washing watercraft and trailers. Pressure washing with hot water is preferred, when possible.

NOTE: If pressure washing is not an option, disinfect the boat with a 20% commercial bleach solution and rinse the boat and trailer with water. Chemicals may damage some motor components and other parts. Refer to owner or manufacturer manuals for specifications on equipment.

- 3) Re-inspect the watercraft after it has been washed and feel around for any attached organisms. Be especially aware of small mussels that can simply feel like small rough spots. These could be dreissenid mussels (quagga or zebra), which are particularly destructive AIS. If quagga or zebra mussels are suspect, immediately notify FWP at (406) 444-2535 or an AIS specialist (<http://fwp.mt.gov/fishAndWildlife/species/ais/contact.html>). Provide your contact information, specific location of discovery, and digital photographs of the organisms (if possible).

Watercraft should always be properly decontaminated before being stored regardless of the next planned field outing. It is recommended to leave the boat outside in the sun after opening and exposing compartments and wet locations. Towel dry areas that tend to remain wet.

10.4 WATERCRAFT DECONTAMINATION FROM MUSSEL POSITIVE OR SUSPECT WATERS

If a watercraft is being launched into an either a mussel positive or suspect waterbody (determined in **Section 10.1**) the watercraft is to be restricted to that waterbody. Do not launch that watercraft into any other waterbody without a thorough decontamination as described in **Section 10.3** and inspected at an FWP watercraft inspection station. Coordinate with FWP if any intensive decontamination is needed such as a hot water flush through the engine system. Follow all appropriate engine manufacturing recommendations and restrictions when flushing water through the engine.

11.0 DATA AND RECORDS MANAGEMENT

All Safety data sheet (SDS) are to be kept in a marked binder in the same building as the stored chemicals and copies of the appropriate SDS should be brought into the field with field personnel.

12.0 QUALITY ASSURANCE AND QUALITY CONTROL

Field audits may be conducted by the project manager, quality assurance officer or other to verify that field activities, including AIS decontamination, are following procedures as described in this document.

Project managers should include information pertaining to AIS, as needed, in end of year project reports.

13.0 REFERENCES

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