

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

# Invasive Species Management Protocols

Version 4



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**Aquatic Invasive Species Unit  
Fish Program**

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# INTRODUCTION

## A. Overview

The Washington Department of Fish and Wildlife (WDFW; Department) serves Washington's citizens by preserving, protecting, and perpetuating fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities. In order to support WDFW's mission in addressing these major environmental issues, the Aquatic Invasive Species Unit (AISU) and Department programs are tasked with preventing the introduction of, and early detection monitoring of, terrestrial and aquatic invasive species transported into or spread within the state through various pathways.

Invasive species (IS) pose an exceptional risk to native flora and fauna and to many industries in Washington State including agricultural, hydroelectric, and recreational. Across the globe, adverse ecological interactions between IS and native species as well as negative impacts on the trade and commerce of regulated non-native species due to the presence of IS have been well documented. The Department is committed to minimizing these threats to the state's ecosystem and economy that stem from the introduction and spread of IS.

This document establishes protocols for Department employees engaged in activities that may place them in direct or indirect contact with known and unknown IS, or that might otherwise cause or contribute to the introduction or spread of IS. The protocols have been developed in consultation with the Washington Invasive Species Council, Washington Department of Transportation, Pacific States Marine Fisheries Commission, National Oceanic and Atmospheric Administration, U.S. Bureau of Reclamation, and the U.S. Geological Survey. Although directed towards Department employees, these protocols are often adopted by other local, state, and federal agencies, tribes, and non-profit organizations.

## B. Policy Background

Policy 5310, Managing Invasive Species, commits the Department to "adopt and actively maintain science-based protocols for minimizing the risk that field and property management activities will contribute to the spread of invasive species." The procedural accompaniment to the policy (Procedure 5310) established an Invasive Species Management Committee (ISMC) and assigned to the ISMC responsibility for developing IS introduction and spread prevention protocols. The AISU is responsible for implementing and updating the protocols, ensuring that IS information is disseminated in a timely manner, and that any necessary training needed to comply with the protocols is made available to Department employees and other entities as resources allow.

## C. Adaptive Management

The AISU relies upon best available science to develop prevention protocols. Few published protocols offer safe and effective prevention over broad suites of IS, and the

effects of protocols known to be successful at preventing the introduction or spread of some species may remain untested or poorly understood for others. The AISU will keep abreast of relevant scientific developments and use adaptive management to update or otherwise alter existing IS prevention protocols when indicated. Where knowledge of safe and effective IS prevention measures remain incomplete or altogether lacking, experimental efforts aimed at developing novel prevention approaches may be implemented. Any such experiments will be informed, designed, and evaluated for efficacy using the best available science. Further, the AISU will remain vigilant, responsive, and sensitive to any prevention implementation issues that may arise.

#### **D. Implementation Timeline**

Some protocols can be followed at little or no additional cost to the Department and with minimal impact to existing field operations. For instance, a simple three step process known as Clean, Drain, and Dry is the nationally recognized standard technique for inhibiting the introduction and spread of AIS by vessel transport. The Clean Drain Dry process is consistent with existing statewide statutory prohibitions against transporting aquatic plants, noxious weeds, and prohibited aquatic animal species. It can be employed with minimal, if any, additional cost in dollars or time and should be implemented immediately. Other protocols may require more substantial changes to current practices including increased costs for training or greater capital investments in containment and decontamination equipment. Those protocols may take more time to implement; however, directed efforts toward full implementation should begin as soon as possible.

# **PART I. PROTOCOLS FOR FIELD WORK IN TERRESTRIAL AREAS**

## **A. Internal Consultation/Approval**

1. When any acquisition, habitat enhancement/restoration, or construction projects are proposed, the Regional Director should be notified, and the project operation plans distributed to Department and Program IS management leads for review.
2. Before conducting field work, project personnel will determine whether any activities will occur in an area with known IS, and ensure that work plans allow for suitable decontamination, access to appropriate decontamination equipment, and appropriate staff training.
3. When conducting field work on Department-owned lands covered under a Wildlife Area Management Plan, employees will meet the requirements of any Weed Management Plans and consult with the Wildlife Area Manager or Access Site Manager prior to commencing field work.
4. On other public lands, the Department will consult and comply with any existing local IS management rules or requirements.
5. Department employees will follow basic weed-free precautions by ensuring all equipment, vehicles, and clothing are free of IS prior to entering the field. While in the field, workers should periodically check their clothing, including footwear, and remove any attached weed seeds or other forms of flora. Before leaving a work site, all equipment, vehicles, and clothing should be visually inspected, and any attached seeds or other forms of flora removed. When it is impracticable to return detached material to its point of origin, it should be placed in a sealable, non-breakable container and disposed of in a manner that ensures they do not remain viable once discarded. Before moving to a new site, vehicles should be thoroughly washed in a contained area, paying special attention to the flooring, undercarriage, grill, and wheel wells.
6. Department employees should ensure that any wildlife translocation or relocation efforts comply with current pathogen/disease screening criteria.<sup>1</sup>
7. Department employees should observe any special precautions required for field work at bat roosts/caves, (particularly, as they relate to prevention of the introduction or spread of fungal disease, white-nose syndrome).<sup>2</sup>

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<sup>1</sup> Contact Kristin Mansfield (WDFW Veterinarian) 509-892-1001 Ext 326, [Kristin.Mansfield@dfw.wa.gov](mailto:Kristin.Mansfield@dfw.wa.gov).

<sup>2</sup> Contact Abigail Tobin (WDFW White-Nose Syndrome Bat Coordinator) for White-nose Syndrome decontamination protocols: 360-999-7958, [Abigail.Tobin@dfw.wa.gov](mailto:Abigail.Tobin@dfw.wa.gov)

8. When sourcing sand, gravel, or fill for projects, Department employees should ensure the pit is free from IS, with confirmation from with the local noxious weed control board.<sup>3</sup>

## **B. Protocols for Purchasing Hay**

Hay purchased for wildlife feeding must meet prescribed nutritional requirements and be available in bale sizes that are compatible with agency feeding equipment. To reduce the risk of introducing noxious weeds through hay, the following procedure should be followed:

1. Use feed that is certified weed-free when available.<sup>4</sup> Explore opportunities to improve market availability. In addition, weed-free hay must be free of other weeds that are not currently listed as “noxious weeds” or “prohibited plants and seeds” but pose a threat to agency lands (e.g., Ventenata (*Ventenata dubia*), cheatgrass (*Bromus tectorum*), etc.).<sup>5,6</sup>
2. Purchase of hay that is not certified weed-free must address noxious weeds or other unwanted plants, including inspection of bales or hay fields.
3. Feeding of wildlife will occur in established feed sites to reduce the potential spread of weeds to wild lands. These feed sites will be surveyed and treated annually for new weeds.

## **C. Protocols for Purchasing Seeds and Rootstock for Revegetation**

The agency purchases seeds and rootstock for habitat restoration/enhancement projects, planting forage crops, and for general landscaping needs. Eliminating noxious weed seeds and propagules in vegetation purchased by the Department will help reduce the potential for infestations on Department-owned and adjacent lands. Revegetation plantings will be consistent with ecological integrity goals and objectives identified for the site. To accomplish this, the following procedure should be followed:

1. Purchase native plant seeds and rootstock adapted to the project area, when appropriate.
2. Ensure that the bid and contract language for seeds and rootstock meet quality standards for noxious weeds/unwanted plants; pathogens; or disease. Request appropriate certification documentation when applicable.
3. Restoration/enhancement and agricultural fields must be revisited periodically and treated for weeds.

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<sup>3</sup> Contact information for local noxious weed control boards: <https://www.nwcb.wa.gov/contact-your-county-weed-boards>

<sup>4</sup> <https://agr.wa.gov/services/licenses-permits-and-certificates/plant-permits-and-certification-programs/wwham>

<sup>5</sup> <https://www.nwcb.wa.gov/printable-noxious-weed-list?>

<sup>6</sup> <https://www.nwcb.wa.gov/noxious-weed-quarantine-list>



4. Refer to the Department's *Stream Habitat Restoration Guidelines* (2012), *Landscaping for Wildlife in the Pacific Northwest*, and *PNW Weed Management Handbook* for information regarding planting and weed control.

## **PART II. PROTOCOLS FOR CONDUCTING FIELD WORK IN AQUATIC ENVIRONMENTS**

### **A. Aquatic Management Areas**

1. Freshwater Ecosystems - AIS Freshwater Management Area (FMA) boundaries coincide with those of Washington State's Watershed Resource Inventory Areas (WRIAs; Figure 1).

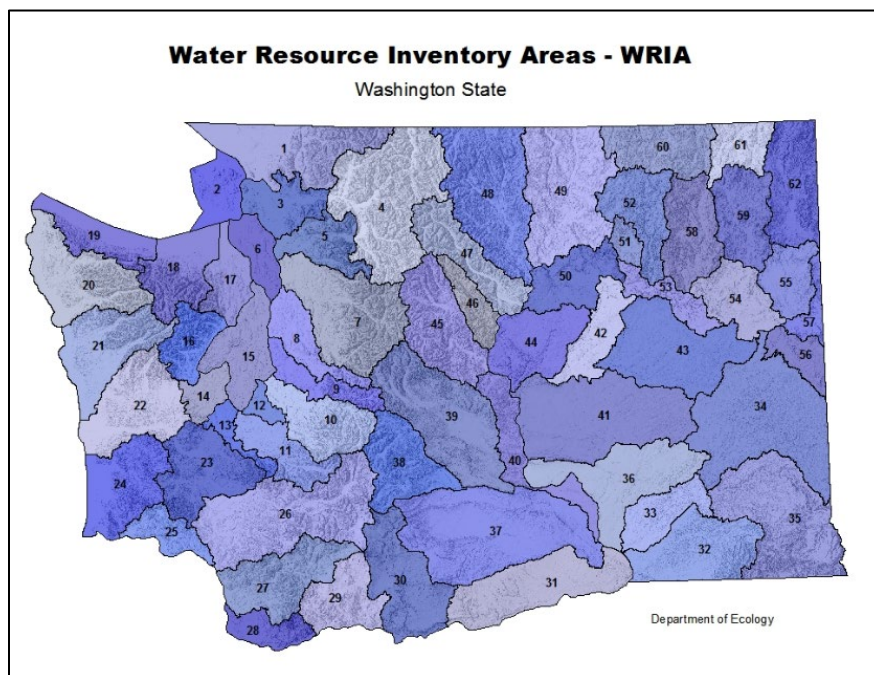


Figure 1. Map of Washington state's Watershed Resource Inventory Areas (WRIAs). Map available on the Department of Ecology website: [www.fortress.wa.gov/ecy/gispublic/datadownload/ecy\\_wat\\_wria.jpg](http://www.fortress.wa.gov/ecy/gispublic/datadownload/ecy_wat_wria.jpg).

To prevent the introduction or spread of AIS, Level 1 Decontamination protocols (as defined below) are required whenever moving from one freshwater water body to another including delineated streams or other aquatic habitats that serve as conduits between water bodies, regardless of whether they occur in the same FMA.

Level 2 Decontamination (as defined below) is required:

- When moving across FMA boundaries, or

- When leaving known AIS infested waters<sup>7</sup>, or
- Before entering protected or highly sensitive sites, or
- When moving between still-water habitats (e.g., lakes, marshes, ponds, reservoirs, or other freshwater impoundments) that have no surface water connections to streams or other aquatic habitats regardless of whether they are in the same FMA.

Each region is responsible for reviewing the FMA boundaries and determining whether additional delineation at the sub-FMA level is necessary in order to determine whether a sub-FMA contains known infestations or to protect vulnerable ecosystems or native populations. Current maps delineating WRIA (FMA) boundaries are available on the SalmonScape website.<sup>8</sup> If additional sub-FMA boundaries are deemed necessary, they will be posted on the Department’s intranet.

2. Marine and Estuarine Ecosystems - AIS Marine and Estuarine Management Area (MEMA) boundaries are depicted in Figure 2.

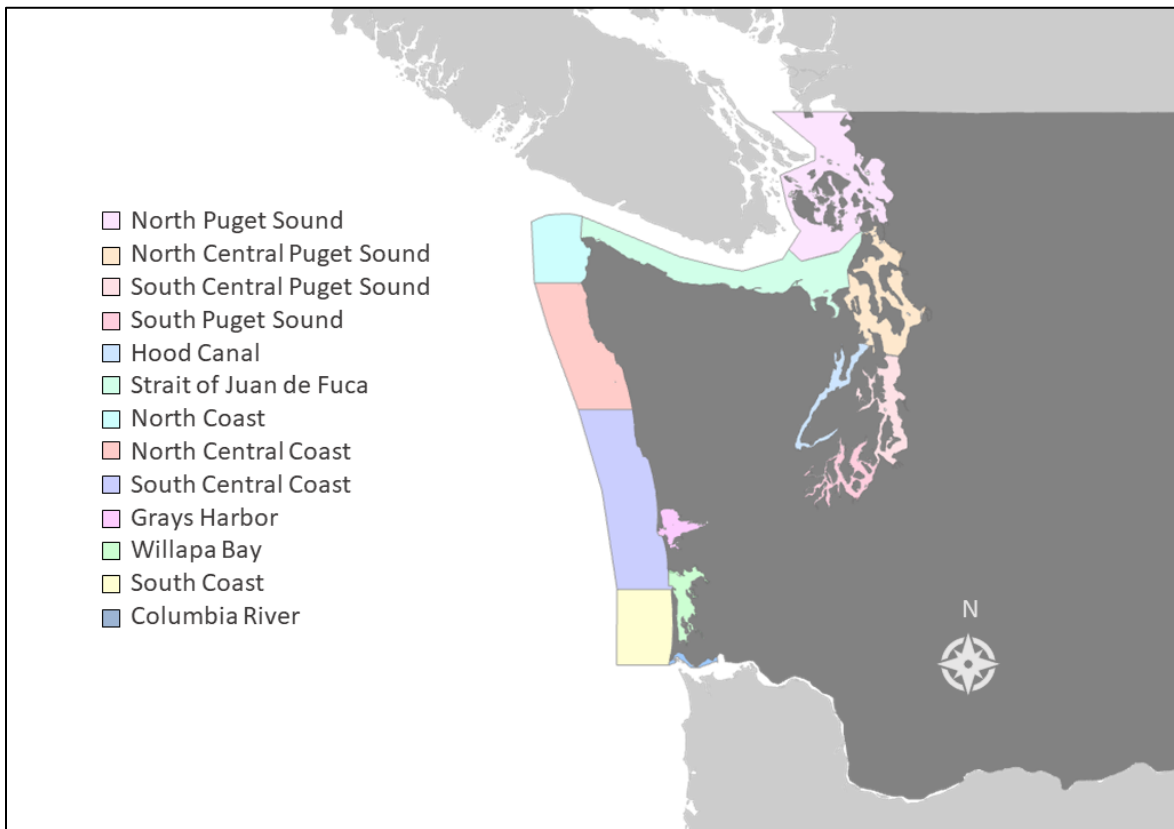


Figure 2: Map of AIS Marine and Estuarine Management Area (MEMA) boundaries in Washington state.

<sup>7</sup> A WDFW AIS detection map is still in development. In the meantime, reference the following websites:  
 Nonindigenous Aquatic Species (USGS): <https://nas.er.usgs.gov/>  
 Weed Distribution (WSDA): <https://agr.wa.gov/washington-agriculture/maps/weed-distribution>  
 Lakes Environmental Data (WS Ecology): <https://apps.ecology.wa.gov/coastalatlantools/LakeDetail.aspx>

<sup>8</sup> <https://apps.wdfw.wa.gov/salmonscape/map.html>

To prevent the introduction and spread of AIS, Level 1 Decontamination protocols are required whenever moving from one MEMA to another. See Special Protocols (Section E) for moored vessels and other typically stationary large aquatic equipment (e.g., fish rearing net pens, docks).

Level 2 Decontamination is required for equipment or vessels:

- Whenever transported from known AIS infested waters<sup>9,10</sup>, regardless of whether they are in the same MEMA, or
- Before entering protected or highly sensitive areas (e.g., National Wildlife Refuges, restoration sites).

## **B. Decontamination Protocols – General Precautions and Definitions**

In General - All staff are encouraged to apply basic precautionary principles to prevent the introduction or spread of AIS including:

1. Prevent/Minimize - Field staff should be aware of AIS infestations as they occur within their areas of activity and assess whether in-water work is necessary. If in-water work is unavoidable:
  - Arrange survey/sampling plans to move from the least to the most likely to be contaminated areas within a water body.
  - Sample from upstream to downstream in a watershed or from areas of less weed growth to dense weed growth.
  - Minimize wading and avoid running boats into sediment.
  - Consider using sampling poles deployed from the bank instead of wading.
  - Consider purchase of wading gear and boots with the fewest places for organisms and debris to become attached. Best are one-piece systems with full rubber material and open cleat soles. Riskiest are the multi-piece wading systems with fabrics, detachable boots and felt soles. Mud/rock guards are recommended for all stocking-foot wades to minimize contamination on inside surfaces.
  - Reduce the amount of plants, sediment, or organisms that are removed from the water into boats or sampling gear.
  - Get in the habit of regularly inspecting and cleaning gear while working.

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<sup>9</sup> A WDFW AIS detection map is still in development. In the meantime, reference the following websites:  
Nonindigenous Aquatic Species (USGS): <https://nas.er.usgs.gov/>

Weed Distribution (WSDA): <https://agr.wa.gov/washington-agriculture/maps/weed-distribution>

Lakes Environmental Data (WS Ecology): <https://apps.ecology.wa.gov/coastalatlus/tools/LakeDetail.aspx>

<sup>10</sup> AIS infested water bodies within a MEMA can include, but are not limited to embayments, estuarine channels, estuaries, reaches, and lagoons.

2. **Dedicated equipment** - When working in known AIS infested water bodies, field staff should maintain unique sets of dedicated equipment and clothing such as waders, nets, and other sampling tools to prevent the transfer of AIS to uncontaminated areas. Dedicated equipment does not need to be cleaned or decontaminated after each use if labeled and kept isolated from other equipment to avoid cross-contamination. Dedicated equipment must be decontaminated prior to use in another water body.
3. **Aquatic conveyance** - As defined under RCW 77.135.010(1), “aquatic conveyance means transportable personal property having the potential to move an aquatic invasive species from one aquatic environment to another. Aquatic conveyances include but are not limited to vessels and associated equipment, float planes, construction equipment, fish tanker trucks, hydroelectric and irrigation equipment, personal fishing and hunting gear, and materials used for aquatic habitat mitigation or restoration.” This includes equipment used by field staff such as listed in “dedicated equipment” above.
4. **Decontaminate** - As defined under RCW 77.135.010(8), "decontaminate means, to the extent technically and measurably possible, the application of a treatment to kill, destroy, remove, or otherwise eliminate all known or suspected invasive species carried on or contained within an aquatic conveyance or structural property by use of physical, chemical, or other methods. Decontamination treatments may include drying an aquatic conveyance for a time sufficient to kill aquatic invasive species through desiccation.”

## **C. Level 1 Decontamination Protocol - Basic**

In General - The basic steps in decontamination for all types of aquatic conveyances in all situations are Clean, Drain, Rinse, and Dry. The basic Level 1 Decontamination cleaning equipment is a sturdy bristle brush, a boot pick, potable rinse water, and a clean rag or towel(s). Basic protocol includes:

- Clean off any attached sediment, organisms, or debris from surface areas that were in contact with the water, underwater bottom, or wetted perimeters immediately upon leaving a water body. Use the brush, boot pick, and water of origin to help remove heavy deposits. For multi-piece gear, it is critical to remove attachments and boots to allow for full cleaning coverage.
- Drain any water back into the water body from which it came.
- Rinse all surface areas with potable water. Rinse water can be kept in a 3-5 gallon (10.5-17.5 L) water tank in your field vehicle (e.g., water cooler, pressurized tank sprayer; solar shower).
- Dry aquatic conveyances, or allow time to dry, before being used at another site. To dry aquatic conveyances completely, either wipe down with a clean rag/towel or hang up or lay out in a way that allows for drying over time.

Level 1 Decontamination that is conducted immediately after leaving the water does not require containment of rinse liquids or removed debris. If the Level 1 procedures cannot

be done in the field, gear must be placed in a plastic bag or tote for transportation to a proper decontamination station.

Note on the cleaning equipment: Once you have completed a Level 1 Decontamination on aquatic conveyances, clean, rinse, and dry all decontamination equipment used.

## **D. Level 2 Decontamination Protocol - High Risk Situations**

In General - Level 2 Decontamination use physical and/or chemical treatments based on best available science and best professional judgment. Criteria for each treatment are applicable to gear or equipment types as noted. Protocols for each treatment are footnoted to identify the scientific literature the method follows and the species of organisms for which it was tested. Level 1 Decontamination clean and drain protocols must be conducted prior to starting Level 2 protocols to ensure the effectiveness of the Level 2 treatments.

Field gear must be decontaminated every day of use (excluding gear used solely in one water body or sub-FMA). When decontaminating multi-piece gear, it is critical to remove attachments and boots to allow for full exposure to all potentially contaminated surfaces. Chemical agents or physical treatments must maintain contact with the entire surface for the duration of the treatment to be effective. Exposure times start when equipment is fully saturated or reaches appropriate temperatures. Safety glasses and waterproof gloves are required for all treatments except freezing.

Note: Gear and equipment undergoing Level 2 Decontamination do not have to follow the Dry step of Level 1 Decontamination before beginning Level 2 protocols.

**Hot Water Treatment**<sup>11</sup> – This is the Level 2 Decontamination **Department-Preferred Method** for most aquatic conveyances and species: Hot water treatment can be by soaking or applying with a hot water pressure washer. A hot water pressure washer capable of 140°F (60°C) may be made available upon request. Note: 140°F (60°C) and higher temperatures cannot be achieved using most hot water heaters that are installed for domestic uses, which should be kept at 120°F to avoid burns.

- Hard non-porous surfaces require constant exposure for a minimum of 140°F (60°C) at a minimum of fifteen (15) seconds.
- Porous materials and gear with multiple folds/cavities require constant exposure at a minimum of 140°F (60°C) for a minimum five minutes or at 120°F (49°C) for a minimum of 30 minutes.
- If whirling disease is a possibility, you must use at a minimum of 167°F (75°C) for a minimum of five minutes.

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<sup>11</sup> Maximum temperatures based on Johnson et al. 2003 under laboratory conditions for Chytrid fungus. Supports other decontamination studies for juvenile and adult New Zealand Mudsnaills, zebra and quagga mussels, and Didymo species by Medhurst 2003, Morse 2009, and USFS Fire Guidance 2008 respectively. Whirling disease criteria from Wagner et al. 2003.

**CAUTION:** These temperatures can burn exposed skin. Do not use this method for Gortex or other materials that cannot hold up to high temperatures.

**Freezing Treatment**<sup>12</sup> - Expose aquatic conveyance to 14°F (-10°C) or colder for a minimum of 8 hours or 15°F to 32°F (-9°C to 0°C) for 24 hours. If the aquatic conveyance has been used in marine or estuary situations, rinse thoroughly with potable fresh water before freezing. Do not use for whirling disease or fish virus decontamination.

**Virkon® Aquatic Solution Treatment** - Must be mixed in a well-ventilated area, preferably outdoors. A splash apron, gloves and safety goggles must be used. The powder should be mixed with clean water according to the dilution instructions for a 1% or 2% solution. Do not apply the powder directly on the surface you are trying to disinfect. Mix the solution in a clean container of known volume. Measure the correct amount according to the dilution table (1 quart, 1 gallon, 10 gallons, or 50 gallons). Refer to the Virkon Aquatic instructions and SDS sheets for chemical storage, use, dilution, and disposal.

- Decontamination for bacteria and viruses (micro-organisms) requires soaking gear thoroughly with 1% solution so that it is completely saturated for a minimum of 10 minutes.<sup>13</sup>
- Decontamination for larger aquatic organisms such as New Zealand mudsnails and zebra/quagga mussels requires soaking gear thoroughly with 2% solution so that it is completely saturated for a minimum of 20 minutes.<sup>14</sup>
- Rinse thoroughly in a contained area and dispose of rinse water according to label instructions.

Virkon Aquatic solutions can last up to seven days or more and will need to be checked regularly. Test strips can be purchased to test your solution. It is not known to damage gear or equipment materials. Wear protective gear, eye protection, and gloves when using.

**Formula 409 Solution Treatment**<sup>15</sup>- Must use anti-bacterial version. Expose aquatic conveyances thoroughly to 100% solution for a minimum of 10 minutes. Rinse

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<sup>12</sup> Minimum temperatures based on Bergendorf 2004 for adult New Zealand Mudsnails and Kilroy et al. 2006 for Didymo. Using conservative criteria as literature studies show high variability in effectiveness. Effectiveness of freezing for whirling disease questioned by Hendrick et al. 2008 as may not completely inactivate cells.

<sup>13</sup> Criteria based on Johnson et al. 2003 (Chytrid fungus), VESO 1991, Frerichs 1990, Hellstrom and Johansson 1990, Bennett 1997, and Rainnie 2002 on multiple fish bacteria and viruses- NOT tested on whirling disease.

<sup>14</sup> Stockton 2011 for eradicating New Zealand mudsnails and quagga mussels in fish hatcheries.

<sup>15</sup>Criteria based on Schisler et al. 2008, Acy 2015, and Ethaiya 2018 on adult New Zealand mudsnails only; Hedrick, McDowell, and Mukkatira 2008 on whirling disease infection; and Shelley et al. 2013 on *Geomyces desruptans*.

thoroughly in a contained area. Rinse water must be disposed of down a sewage drain, not a storm drain.

Note on the cleaning equipment: Once you have completed a Level 2 Decontamination on aquatic conveyances, clean, rinse, and dry all decontamination equipment used.

## E. Special Protocols

**Felt Sole Waders/Boots** - Felt soles are one of the largest aquatic conveyance risk factors for introduction and spread of invasive species since they are extremely difficult to fully decontaminate. Consequently, Department policy is that all alternatives should be explored before deciding to use felt soles. The primary challenge with decontaminating felt soles is the porosity and depth of the material which makes it very difficult for treatments to effectively decontaminate the entirety of the porous matrix. For this reason, chemical decontamination treatments are inadequate for this protocol and exposure times for hot water must be sufficient to ensure that target temperatures are reached and maintained for an adequate period of time throughout the porous matrix. Some manufacturing companies are phasing out felt-sole boots from their lines and offering non-porous rubber sole/cleat combinations in their place.

Felt sole waders/boots may only be used under the following conditions:

1. With the approval of the Program Director or Assistant Director, based on their determination that no other suitable alternatives exist.
2. Use of the Department-Preferred Method of using dedicated felt sole waders/boots within an area of known infested waters not to exceed a single FMA/MEMA. A Level 1 Decontamination must still be conducted between uses.
3. If felt sole waders/boots must be used between different known infested waters within the same FMA/MEMA or between different FMA/MEMAs, a Level 2 Decontamination must be conducted using one of the following treatments (Note that these treatments are not suitable for Whirling Disease or fish viruses):<sup>16</sup>
  - Hot water treatment using standard soaking in constant 120°F (49°C) for a minimum of 30 minutes protocol;<sup>17</sup> or
  - Freezing treatment using standard protocols.

**Wading “Wet”** - Any gear or clothing that gets wet from a water body are potential aquatic conveyances for spreading AIS. Crews that prefer not to wear dedicated wading

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<sup>16</sup> Based on Kilroy et al. 2006. Studies on the survivability of the invasive diatom *Didymosphenia geminata* under a range of environmental and chemical conditions. NIWA Client Report CHC2006-116. For Biosecurity New Zealand. 110p. Revised May 2007. [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsbdev3\\_015419.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_015419.pdf)

<sup>17</sup> Unsure of effects of higher temperatures on glue used to adhere felt to boot, but if  $\geq 140^\circ\text{F}$  ( $60^\circ\text{C}$ ) treatment applied, must be for a minimum of 10 minutes (best professional judgment) to allow full penetration.

gear must launder their clothing for decontamination or use an alternate set of clothing after each day's use.

**Boats and Other Large Aquatic Conveyances Transported Overland** - State law requires that boats and other trailered aquatic conveyances used in an aquatic environment should be free of aquatic animals and plants, including native species, once removed from the water and prior to transport to a new water body.<sup>18</sup>

Conduct a Level 1 Decontamination when removing, or before overland transport, of boats and other large aquatic conveyances. This is required every time you remove the boat from a body of water. No exceptions.

1. Thoroughly inspect both the equipment and trailer for attached or loose organisms such as weeds, algae, barnacles, mussels, snails, etc. A hand mirror and flashlight are important tools to help you see into otherwise hard to reach areas.
2. Scrape, or remove, all organisms and put into a secure trash receptacle for upland disposal if not able to return to water of origin.
3. Pull the drain plug at the boat ramp and drain all water in bilges and live wells that could hold water from the site. Rinse with potable water. Dry with a rag inside and out.

If Level 2 Decontamination is indicated, use a Department hot water pressure washer:

1. Apply constant exposure at a minimum of 140°F (60°C) for a minimum of fifteen (15) seconds on hard/non-porous surfaces;
2. Flush engine cooling system with potable water at 140°F (60°C) for a minimum of 5 minutes, or at ambient temperature for 10 minutes (no chemicals) if hot water is not available;

OR, a combination of Level 2 Decontamination methods, as described in Part II (D) *Level 2 Decontamination- High Risk Situations*.

Cross-rinsing is not allowed. Taking a boat or other aquatic conveyance from a marine environment into a freshwater environment or from a freshwater to a marine environment without decontaminating does not meet decontamination requirements and is not allowed.

**Moored boats and other typically stationary large aquatic conveyances** - Boats and other large aquatic conveyances shall not be transported on the water between different FMAs on larger rivers or lakes, or MEMAs until a thorough inspection ensures that no aquatic organisms are attached to the hulls, docks, nets, or other submerged equipment being moved. Boats that travel between different FMA and MEMA regions frequently must have their hulls, running gear, and other niche areas (water intakes, prop shaft, trim tabs, etc.) cleaned using the protocols above on at least a quarterly basis, or more often during high growth periods. As with boats, nets and other gear, dedicating boats to a body of water is a desirable approach. However, even boats that

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<sup>18</sup> RCW 77.15.253 and 77.15.290



remain in a single body of water should be checked quarterly as described above to minimize hull fouling.

**Nets** - When possible, use water body specific nets and gear. If this is not possible, nets must be decontaminated before use in a new area. If possible, conduct a Level 1 decontamination before leaving the sampling area by hanging or stretching the net, and using a pressure washer and hand-picking to remove excess mud, debris, and plant matter. If field decontamination is not possible or effective, contain the nets so any species cannot escape, then follow the decontamination guidelines for waders/boots above upon return to the office or before deploying at another sampling location in a different water body. Either hang the nets to allow clear access to all parts, or soak in a large tub that allows the solution to fully penetrate the material before starting minimum exposure time.

**Vehicles** - Determine which vehicles will be used in bodies of water (i.e., hatchery trucks that back down into the water to off load fish). Also determine which vehicles will be moving in between established FMA or MEMA sampling areas. Follow protocols for aquatic conveyances transported overland, including determination whether a Level 1 or 2 Decontamination is indicated.

**Fish Tankers** - It is vital that fish transfer tanks be disinfected when used between watersheds. If fish tankers cannot be decontaminated with the Level 2 Decontamination methods described in Part II (D) *Level 2 Decontamination- High Risk Situations*, other chemical methods must be used. Liquid chlorine bleach, which is available in several concentrations, is the preferred disinfectant for this use. Chlorine in solid form is also an effective disinfectant but is difficult to dissolve completely and has high human health risks, and therefore not recommended. To properly disinfect tankers, use the following protocol:

1. Fill the tanker approximately half-full with water at the shipping station. Add enough liquid chlorine bleach to achieve a 20-ppm active ingredient solution (30 ppm if water is noticeably dirty or discolored), Table 1.
2. Recirculate this solution for at least 10 minutes in the tanker and fish pump so that all surfaces are wetted.
3. Following recirculation add the appropriate amount of sodium thiosulfate, (Table 1.) to the tanker and circulate another 10 minutes to neutralize the chlorine and make it safe to discharge.
4. As a precaution, prior to discharge, check the water in the tanker with a test kit to make sure the chlorine is COMPLETELY neutralized.
5. Empty the tank where the discharged water will not contact fish.
6. Rinse thoroughly and refill with clean uncontaminated water for fish hauling.

Table 1. Chemical quantities required for tanker disinfection.

TANKER SIZE IN GALLONS	AMOUNT OF WATER	AMOUNT OF 12% BLEACH FOR 20 PPM	AMOUNT OF 12% BLEACH FOR 30 PPM	POUNDS OF SODIUM THIOSULFATE TO NEUTRALIZE 20 PPM <sup>19</sup> / 30 PPM
6000	3000 gal.	1811 ml	2717 ml	3.8 / 5.7
2500	1250 gal.	764 ml	1160 ml	1.6 / 2.4
1800	900 gal.	566 ml	849 ml	1.1 / 1.7
1000	500 gal.	311 ml	481 ml	0.6 / 0.9

**Heavy Equipment When Used in Aquatic Environments<sup>20</sup>**- Heavy equipment are considered aquatic conveyances when used in large aquatic construction and restoration projects; thus, it is important to be aware of any established AIS at or near a project site that can be spread through project activity. Inspection across the entirety of the equipment is encouraged but should be focused primarily on equipment’s points of contact with raw water or substrate (including, but not limited to, buckets, drills, augers, shovels, treads, tracks, undercarriage, wheel wells). Project managers should be aware of any AIS established or detected in a 2-mile radius of the work site prior to operations. Refer to footnote 8 in Part II (A) “*Aquatic Management Areas*” for AIS maps.

Conduct a pre-work inspection on heavy equipment for any visible dirt, other inorganic materials, and organic debris (including animals and plants). Visually inspect and physically feel, when possible, inside, outside, and underneath all parts of equipment. Use of a flashlight and hand mirror are highly encouraged. Remove any attached material using brushes, picks, grabber tools, etc. and rinse with potable water.

Inspect the equipment a second time once on site, preferably by someone who did not perform the first inspection. If attached materials are found, reject the equipment from the work site until it is cleaned and passes re-inspection.

Conduct a Level 1 Decontamination before heavy equipment leaves the work site after use. This is required every time heavy equipment is removed from an aquatic environment. No exceptions.

1. Clean the equipment of any accumulated organic and inorganic material using brushes, picks, grabber tools, etc.

<sup>19</sup> 5.6 grams sodium thiosulfate per 10 gallons of 20-ppm chlorine.

<sup>20</sup> Developed using standard operating protocols from NOAA (“Preventing Invasive Species: Inspection of Vehicles, Equipment, and Personal Gear”), U.S. Bureau of Reclamation (“Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species,” 2021, eds. Scott O’Meara and Jolene Trujillo), and Washington Dept. of Transportation (“Aquatic Invasive Species [New Zealand Mud Snail] Prevention Guidelines”, 2015, WSDOT Maintenance Operations).

2. Drain any raw water trapped in or on equipment. At this time, special attention should be paid to equipment parts that spent time in, or contacted, raw water and/or substrate.
3. After mechanically removing accumulated materials or securing them to prevent spillage or leakage during transport, bring heavy equipment to an upland facility and rinse with potable water, removing any remaining debris.
4. Ensure the rinsed material cannot flow into surrounding water bodies, man-made or natural. Dry, or allow time for the equipment to dry, prior to use at another site.

If the work site has known AIS establishment or detections within a 2-mile radius conduct a Level 2 Decontamination after completing Level 1 Decontamination. Ensure any rinsed material cannot flow into surrounding water bodies, man-made or natural. Any spoil material removed from sites with known AIS establishment or detection must be transported in a plastic-lined bed to prevent leakage and spillage during transport and disposed of in an upland facility where AIS cannot be introduced or spread into surrounding water bodies. This includes introduction and spreading into storm and sewer drains.

**Aquatic Restoration Guidelines-** Aquatic restoration can occur in freshwater, estuarine or marine environments, is complex, and involves potential aquatic conveyances such as construction materials, equipment and personal gear that need to be inspected for AIS. All staff involved with aquatic restorations are encouraged to follow and apply the basic precautionary principles to prevent the introduction or spread of AIS as provided in Part II (B) “*Decontamination Protocols- General Precautions and Definitions.*”

General guidelines for restoration projects before project start include:

1. Ensure that heavy equipment and associated gear is clean and free of debris (mud, encrusted soil, animals, plant matter, etc.) and standing water before being transported to and from the project site. Refer to Part II (E) “*Special Situations; Heavy Equipment.*”
2. Ensure that construction materials being brought to the project site do not harbor AIS or other IS that could invade stream banks. Construction materials include, but are not limited to, hay, cobble, gravel, boulders, revegetation materials, and large woody debris (LWD). Refer to Part I (B) “*Protocols for Purchasing Hay*” and Part I (C) “*Protocols for Purchasing Seeds and Rootstock for Revegetation.*”

Throughout project duration and at the project’s end, follow Level 1 Decontamination protocols when construction materials, equipment and personal gear come and leave the project site. This is applicable regardless of whether the project site is in a FMA or MEMA with or without known AIS or IS presence. When the project site is in an FMA or MEMA with known AIS presence or establishment, conduct Level 2 Decontamination on all equipment and gear that come into contact with the local water body and/or water

body substrate. Any surplus construction materials (hay, spoils, LWD, etc.) leftover after the project's completion must either undergo Level 2 Decontamination or be properly disposed to ensure zero introduction or spread of AIS into any water body, man-made or natural, or IS into adjacent lands.

**Diving Equipment-** The primary challenge with decontaminating diving equipment is the sensitivity of equipment to many chemicals (liquids, solids, and gases) and the intimate nature in which the gear is worn or used by a diver. When conducting dive activities in any water body, the divers and dive team supervisors should know the current status of AIS presence within the water body they intend to dive. All personnel must complete the following:

1. Conduct a Level 1 Decontamination. Level 1 Decontamination is required for all divers and dive equipment when leaving any water body. Personnel must thoroughly inspect gear and equipment for attached mud or other substrates, and organic material such as animals and plant fragments prior to leaving a water body. Water must be drained from buoyancy compensator devices (BCDs), regulators, cylinder boots, or any other water containing devices before leaving the water body area. Watercraft and trailers (if used/ applicable) must be cleaned, drained, and dried or given time to dry. See Part II, Section E, "*Boats and Other Large Aquatic Conveyances Transported Overland*" for watercraft and trailer decontamination protocols.
2. Re-inspect gear and equipment to make sure no organic matter was transported off-site. If organic matter is found, collect in a secure trash receptacle for upland disposal.

When dive work is conducted in a water body with known AIS presence, Level 2 Decontamination of dive gear and equipment can be conducted using one of two methods (refer to Part II (A) "*Aquatic Management Areas*" for AIS maps):<sup>21</sup>

Method 1: Decontamination via washing and air drying:

- a. Visually inspect and remove any attached mud or other substrates, and organic material such as animals and plant fragments prior to leaving water bodies known to be infested with AIS.
- b. Thoroughly soak and rinse all exposed gear and equipment in warm potable water.
  - i. Avoid using water greater than 120°F to avoid damage to temperature-sensitive gear such as regulators.
  - ii. Commercial dive gear cleaners (e.g., wetsuit shampoos) are acceptable disinfecting agents for use with this method.

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<sup>21</sup> Developed from U.S. Geological Survey Standard Operating Procedure "Decontamination of SCUBA diving equipment and underwater gear after diving in waters containing zebra/ quagga mussels (*Dreissena polymorpha/D. bugensis*). 2016. 8 p. <https://www.westernais.org/scuba>

- c. Internally flush BCDs with warm tap water and dry completely following the manufacturer's recommendations.
- d. Ensure that all wastewater goes down a drain that is connected to a municipal sewer system. Do not allow wastewater to enter stormwater drains.
- e. Gear and equipment must be completely dry for a 24-hour period prior to reuse. This includes wet/dry suit seams and other slow-to-dry components.

Method 2: Decontamination via chemicals (e.g., RelyOn Virkon, or Virkon Aquatic):

- a. Visually inspect and remove any attached mud or other substrates, and organic material such as animals and plant fragments prior to leaving water bodies known to be infested with AIS.
- b. Mix a 0.5% solution of RelyOn Virkon.
- c. Soak gear and equipment for 10 minutes then rinse thoroughly with potable water.
  - i. Refer to the label instructions for rinse water disposal.
  - ii. Do not expose metal parts to RelyOn Virkon or Virkon Aquatic for longer than 10 minutes. It is recommended that all metal or equipment with metal that has been treated with Virkon be immediately rinsed with potable water after treatment.
- d. NOTE: BCDs without removeable dump valves must follow Method 1 decontamination. BCDs with removable dump valves can be decontaminated by doing the following:
  - i. Remove 1 valve assembly, pour in 0.5% RelyOn Virkon solution, and replace valve assembly.
  - ii. Inflate the BCD and gently rotate in all directions to allow solution to reach all internal parts.
  - iii. Let sit for 10 minutes, then immediately flush BCD with potable water at least three times, dumping the wastewater via the exhaust hose.
  - iv. Refer to the label instructions for rinse water disposal.

# **PART III. CONDITIONS FOR AQUATIC INVASIVE SPECIES MANAGEMENT ON DEPARTMENT ISSUED HYDRAULIC PROJECT APPROVALS (HPAs), SCIENTIFIC COLLECTION PERMITS (SCPs), AND AIS MONITORING OR CONTROL PERMITS (AISPs) IN ALL WATERS**

**A. All HPA conditions** provided herein meet protection of fish life criteria under RCW 77.55.021(7). The conditions address the threat of detected and undetected aquatic invasive species (AIS) that have the potential to negatively affect fish life by direct or indirect factors including predation, food source competition, habitat displacement, and transmission of diseases and pests.

**B. HPA, SCP, and AISP AIS management definitions** apply to all aquatic conveyances and any organic and inorganic materials brought in from off-site sources that may have come into contact with raw water at another location prior to use in a new location or that will come into contact with raw water at the current work location. The following definitions apply:

1. “Raw water” as defined under RCW 77.135.010 means “water from a water body and held on or within property...[but] does not include water from precipitation that is captured in a conveyance, structure, or depression that is not intended to function as a water body, or water from a potable water supply system, unless the water contains visible aquatic organisms.”
2. “Water body” as defined under RCW 77.135.010 means “an area that carries or contains a collection of water, regardless of whether the feature carrying or containing the water is natural or nonnatural. Examples include basins, bays, coves, streams, rivers, springs, lakes, wetlands, reservoirs, ponds, tanks, irrigation canals, and ditches.”
3. “Aquatic conveyance” (see definition in Part II (B) “Decontamination Protocols-General Precautions and Definitions.)
4. “Organic materials” means mitigation articles such as seeds, dirt, rootstock, natural logs, etc.
5. “Inorganic materials” means construction and structural articles such as silt fencing, culverts, gravel, boulders, treated wood, etc.
6. “Properly dispose” means to dispose of potentially contaminated organic or inorganic materials or raw water in a manner where all potential AIS life stages are not able to survive in the disposal area and establish a new population. This can include disposal at an upland site or facility where zero migration or escapement of any AIS in contaminated materials can be ensured.

**C. To prevent the introduction and spread of AIS** into an HPA, SCP or AISP work location, or the unintentional removal and spread of AIS from a work location:

1. General provisions – follow Part I(A) protocols for internal consultation/approval and follow Part II general and applicable special protocols unless further conditioned or waived in permit.
2. Level 1 Decontamination protocols – applies to all HPA, SCP, or AISP work locations before arriving at or leaving the site:
  - a) Remove all visible dirt and organic debris from gear, equipment (on heavy equipment this includes drive mechanisms, wheels, tires, tracks, buckets and undercarriage), and inorganic materials.
  - b) Drain all raw water from site trapped in or on gear, equipment, and inorganic materials.
  - c) Rinse all gear, equipment, and inorganic materials with potable water to the greatest extent possible.
  - d) Properly dispose of any water used to clean gear, equipment, and inorganic materials.
  - e) Refer to Part II(C) for more information.
3. Level 2 Decontamination protocols – applies to all HPA, SCP, or AISP work locations identified by the Department under this permit as infested:
  - a) Refer to Part II(D) Level 2 Decontamination protocols.
  - b) Select and apply preferred treatment method.
  - c) Properly dispose of any water and chemicals used to clean gear, equipment, and inorganic materials.
4. Off-site alternative decontamination plan required (HPA only).
5. Organic material protocols (HPA only) -
  - a) Organic materials may be sourced from the HPA work location or from the same un-infested watershed as the work location.
  - b) Organic materials sourced from outside should come from dry upland locations or if previously exposed to raw water, have been stored at a dry upland location for a minimum of 3 months unless otherwise conditioned by the Department.
  - c) Organic materials should be certified as weed-free where possible.
  - d) Follow Part I(C) protocols for purchasing seeds and rootstock for revegetation.
  - e) No organic materials collected from a Department-designated AIS infested area may be used at another aquatic work location.

**D. To prevent the spread of known AIS collected at an HPA, SCP, or AISP work location:**

1. HPA, SCP and AISP holders are required to humanely euthanize all collected AIS classified as prohibited level 1 species (WAC 220-640-030), prohibited level 2 species (WAC 220-640-040), prohibited level 3 species (WAC 220-640-050),

unpermitted regulated type A species (WAC 220-640-060), regulated type B species (WAC 220-640-070), and regulated type C species (WAC 220-640-080) except as allowed under bullet 5 below for transport purposes.

2. Detection or collection of prohibited level 1 species<sup>22</sup> must be reported within 24 hours to the Department using one of the methods in subpart E below with photos of the species and specimens saved until provided to the Department or directed to dispose.
3. Unless otherwise directed by the Department, all AIS must be humanely euthanized before being removed from the immediate vicinity of the water body of collection and then disposed of in a public landfill system or chemically preserved.
4. Information on collection (i.e., how, where, number, species, etc.), humane euthanizing, and disposal of AIS must be included in a report submitted to the Department within 30 days using the Washington Invasive Species Council's online reporting form link under subpart E below.
5. HPA and SCP holders may transport live AIS outside the immediate vicinity of the water body of collection only under the following conditions:
  - Transport to nearest Department regional office or headquarters for purpose of identification; AND
  - Transported in a secure container to prevent release of either the AIS or any associated water, plant, sediment, animal, or other materials, OR
  - Transported as authorized by a separate Department AISP secured prior to collection.

## E. Additional Information

- Contact Department Regional Habitat or other Department Biologist as listed on HPAs, SCPs, or AISPs.
- The Washington Invasive Species Council's online reporting form can be found at [www.invasivespecies.wa.gov/report-a-sighting/](http://www.invasivespecies.wa.gov/report-a-sighting/).
- The Department's toll-free reporting phone line is 1-888-933-9247.

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<sup>22</sup> Includes: Zebra mussels (*Dreissena polymorpha*), quagga mussels (*Dreissena rostriformis bugensis*), European green crab (*Carcinus maenas*), and all members of the genus *Eriocheir* (including Chinese mitten crab), all members of the walking catfish family (Clariidae), all members of the snakehead family (Channidae), silver carp (*Hypophthalmichthys molitrix*), largescale silver carp (*Hypophthalmichthys harmandi*), black carp (*Mylopharyngodon piceus*), and bighead carp (*Hypophthalmichthys nobilis*).