

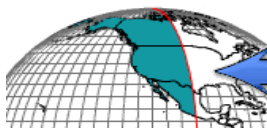
# **Student Training Curriculum for Watercraft Inspectors and Decontaminators to Prevent and Contain the Spread of Aquatic Invasive Species in the U.S.A.**



*Version 2 – Updated February 1, 2016*



**The Western Regional Panel**  
On Aquatic Nuisance Species



**100<sup>th</sup> Meridian Initiative**  
*Help us stop the spread of Aquatic Nuisance Species*

This document has been prepared by Colorado Parks and Wildlife and the Pacific States Marine Fisheries Commission to further the efforts of the U.S. Fish and Wildlife Service's 100th Meridian Initiative, the mission of the Western Regional Panel on Aquatic Nuisance Species, and fulfill priorities within the Quagga Zebra Action Plan.



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DISCLAIMER: The following protocols and standards are provided here to protect natural resources from the damage caused by aquatic invasive species.

This student manual was written by Colorado Parks and Wildlife's Invasive Species Program for the Western Regional Panel on Aquatic Nuisance Species in accordance with the *Building Consensus in the West* guidelines (WRP, 2013-14) and the *Uniform Minimum Protocols and Standards* (PSMFC, 2016).

The original document is titled "*Official State of Colorado Watercraft Inspection and Decontamination Procedures – Certified Training Curriculum for Inspectors and Decontaminators*" (E. Brown, 2016). This document is a combination of the *Colorado Inspection and Education Handbook* (2009), *Colorado ANS Watercraft Decontamination Manual* (2011), *Colorado Boat Compendium for ANS Inspectors* (2012), the *Colorado Containment Manual for Waters Positive for ANS* (2013).

## Table of Contents

Training Agenda .....	5
Chapter 1 – Introduction & Western States AIS Programs .....	8
How are Invasive Species defined? .....	8
What is the purpose of the AIS Inspection and Decontamination Curriculum? .....	8
What AIS are we concerned about? .....	9
Education and Outreach .....	9
Safety .....	10
Western State A.N.S. Programs .....	10
The Mission .....	10
Background .....	10
Mussel Boat Interception Data – 2013 .....	11
State Specific Program Information .....	13
Building Consensus in the West - A Committee of the Western Regional Panel on ANS .....	14
Water Body Listing and De-Listing .....	15
Where are Mussels? .....	17
WID Quality Control .....	18
Research .....	18
Chapter 1 Review Questions .....	19
Chapter 2 - Zebra and Quagga Mussel Biology .....	21
Other A.I.S. Biology .....	26
Asian Clams ( <i>Corbicula fluminea</i> ) .....	28
New Zealand Mudsail ( <i>Potamopyrgus antipodarum</i> ) .....	29
Rusty Crayfish ( <i>Orconectes rusticus</i> ) .....	30
Asian Carp .....	31
Eurasian Watermilfoil ( <i>Myriophyllum spicatum</i> ) .....	33
Water Hyacinth ( <i>Eichornia crassipes</i> ) .....	34
Chapter 2 – Biology Review .....	35
Chapter 3 - Watercraft 101 .....	37
Watercraft Key Terms .....	37
Marine Propulsion Systems .....	38
Watercraft Risk Assessment .....	46

Four Categories of Boats .....	46
Watercraft Risk Assessment (cont.) .....	47
What boats should be inspected?.....	47
What is the biological risk of moving AIS relate to the complexity of a watercraft?.....	48
Boat Anatomy - Where Do We Look?.....	48
Name That Boat Game .....	64
Wakeboard Ballast Tanks and Bags .....	74
Pontoon.....	76
Personal Watercraft .....	78
Chapter 3 Review .....	79
Chapter 4 – Inspection Procedures .....	81
*The Ideal Inspector* .....	81
Role of the Inspector or Decontaminator .....	82
The Goal for Every Boat: .....	82
What are my priorities as a watercraft inspector?.....	82
What Equipment Do I Need?.....	83
Three Types of Inspections: .....	83
Data Collection – Paper, Web or Mobile Devices .....	84
WID Activity Log Form or Data Collectors= INSPECTION PROCEDURE! .....	85
SEALS and RECEIPTS: .....	90
Step-By-Step Procedures for Inspections: .....	95
Inspection Step-By-Step Procedure – Prevention & Containment Entrance or Off-Water Inspection ...	95
High Risk Inspection Procedure – Prevention & Containment .....	98
Exit Inspection Step-By-Step Procedure - Prevention .....	99
Exit Inspection Step-By-Step Procedure - Containment .....	101
Rules for Standing Water, including Ballast Protocol for Unverifiable Water .....	103
Live Aquatic Bait .....	104
Reporting.....	104
WIDS Reporting: .....	104
Chapter 4 Review .....	105
Chapter 5 - Decontamination Manual.....	108



# Watercraft Inspection and Decontamination Course (Level 2)

## Training Agenda

### Day 1 of 2

9:00 am	Welcome!
9:05-9:30 am	Entrance Boat Inspection Demonstration and Discussion
9:30-10:00 am	Introduction: Overview of AIS, Western Programs, Education & Safety
10:00-10:30 am	Zebra and Quagga Mussel Biology
10:30-11:00 am	OUTSIDE – How Many Mussels Can You Find?
11:00-11:30 pm	Other AIS Biology
11:30 – 12:10 pm	Watercraft 101
12:10-12:30 pm	OUTSIDE– Boat Anatomy
12:30-1:30 pm	LUNCH BREAK
1:30-3:30 pm	Inspection Protocol
	OUTSIDE – Data Collection and Seal Removal Procedures (half way through lecture)
3:30 – 4:30 pm	OUTSIDE – Inspection Practice (Groups of three – Boater, Inspector, Observer with QC form)
4:30-5:00 pm	<i>A mussel infested lower unit being decontaminated at Lake Havasu, Arizona.</i> Summarize Day 1.
5:00 pm	Adjourn

STUDENT HOMEWORK – MEMORIZE 8-STEP ENTRANCE INSPECTION PROTOCOL AND ANSWER QUESTIONS AT THE END OF EACH CHAPTER.

# **Watercraft Inspection and Decontamination Course (Level 2)**

## **Training Agenda**

### **Day 2 of 2**

9:00-9:30 am	Review Homework: Questions and Answers at the End of Each Chapter
9:30-9:50am	OUTSIDE: Exit Inspection Demonstration and Discussion
9:50-10:30 am	OUTSIDE: Exit Inspection Practice including Seal Application and Issuing Receipts
	(Groups of three – Boater, Inspector, Observer with QC form)
10:30-11:00 am	Decontamination Presentation
11:00 -12:00 pm	OUTSIDE: Decontamination Unit Standard Operating Procedures, Winterization and Attachments
12:00 -1:00 pm	LUNCH
1:00 – 2:00 pm	Decontamination Manual: Review Step-By-Step Procedures
2:00 – 3:30pm	OUTSIDE: Decontamination Demonstration and Practice
3:30-4:15 pm	Final Exam - Inspector and Decontamination Certification
4:15 – 4:45 pm	Grade Exams & Review Answers
4:45 – 5:00 pm	Course Summary: Questions and Answers
5:00 pm	Adjourn

## **\*Outdoor Demonstration – Entrance Inspection\***

### ***What Did You Observe?***

1. \_\_\_\_\_
2. \_\_\_\_\_
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17. \_\_\_\_\_
18. \_\_\_\_\_

## Chapter 1 – Introduction & Western States AIS Programs

### ***What are Aquatic Invasive Species or Aquatic Nuisance Species?***

Aquatic invasive species (AIS), also known as aquatic nuisance species (ANS), can also be called non-native species, exotic species, non-indigenous species, noxious weeds or invasive pests. AIS can be plants, animals or pathogens. Invasive aquatic plants can live either partially or completely submerged in the water and out-compete native species for light, space and nutrients creating a dense monoculture of the noxious weed. Invasive aquatic animals also out-compete native species and require a watery habitat, but do not necessarily have to live entirely in water.

AIS plants and animals not only threaten native species but also interfere with recreational activities and municipal, industrial, commercial and agricultural water supply, storage and distribution. In their native environments, AIS populations are typically held in check and controlled by predators, parasites, pathogens, or competitors. However, when they are transported to a new environment, these natural checks are usually left behind. This gives invasive species an advantage over native species and makes them very difficult, if not impossible, to control. Long-term management of invasive species is costing the U.S. over \$200 billion dollars a year (Pimental et al 1996).

### **How are Invasive Species defined?**

*“A species that is: 1.) non-native (or alien) to the ecosystem under consideration and 2.) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”*

Executive Order 13112 signed by President William Clinton on February 3, 1999

*“Aquatic Nuisance Species means a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters”*

Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990

Reauthorized - National Invasive Species Act of 1996

### **What is the purpose of the AIS Inspection and Decontamination Curriculum?**

This document details standard watercraft inspection and decontamination (WID) procedures, which have been proven to reduce the risk of AIS being introduced into our precious waters, through implementation of a risk-based prevention and containment program. The personnel certified in this course should adhere to the procedures detailed in this manual. There are two certifications provided in this course – Level 1 and Level 2. Individuals with Level 2 certification can choose to attend a separate course to obtain Level 3 Trainer certification.

Level 1 – Inspector

Level 2 – Inspector and Decontaminator

Level 3 – Trainer

## What AIS are we concerned about?

While this document puts special emphasis preventing introductions of two species that have the most significant economic, cultural and natural resource impacts - zebra and quagga mussels (ZQM) - the procedures apply to all aquatic invasive species, both plant and animal. The following table lists examples of AIS animals and plants that western states are concerned about being transported on watercraft.

### Animals:

Common Name	Scientific Name
Quagga mussel	<i>Dreissena bugensis</i>
Zebra mussel	<i>Dreissena polymorpha</i>
Bighead Carp	<i>Hypophthalmichthys nobilis</i>
Black Carp	<i>Hypophthalmichthys molitrix</i>
New Zealand mudsnail	<i>Potamopyrgus antipodarum</i>
Rusty Crayfish	<i>Orconectes rusticus</i>
Silver Carp	<i>Hypophthalmichthys molitrix</i>

### Plants:

Common Name	Scientific Name
Brazilian elodea	<i>Egeria densa</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Giant Salvinia	<i>Salvinia molesta</i>
Hydrilla	<i>Hydrilla verticillata</i>
Parrotfeather	<i>Myriophyllum aquaticum</i>
Water hyacinth	<i>Eichornia crassipes</i>

It is imperative that inspectors and decontaminations also strive to prevent and/or contain introductions of all invasives by ensuring watercraft and equipment are clean, drained and dry – no mud, no mussels, no water and no plants – before launching and after retrieval in waters.

## Education and Outreach

Education and outreach is the **MOST** important thing to provide to customers! There will never be enough money to have inspectors on all boat ramps all the time. Each inspection is a face-to-face opportunity to educate the boater and change their behavior by teaching them to clean, drain, dry every time they boat. Consistency in messaging is key for boaters to learn Clean, Drain, Dry!

### We Train You. You Train Boaters!

There are many educational tools to help inspectors. Spend time learning the information provided in this course, so all inspectors provide consistent information to the public.

## Safety

The safety of inspectors, decontaminators and the public is high priority. Inspectors must take caution to ensure their own personal safety and the safety of those around the WID station. Boat ramps or highway check stations are busy places with large moving vehicles. Be careful to avoid slips, trips and falls. Ask for permission to board the watercraft and inquire the best way to board. When working on or in watercraft, always maintain at least three points of contact with the watercraft when getting in or getting off the watercraft. Never use a swim ladder to board the watercraft, and never jump off watercraft. Always wear personal protective equipment when performing inspections or decontaminations. Take extra caution when working with hot water or high pressure sprayers. Operating safely is in everyone's best interest!

## Western State A.N.S. Programs

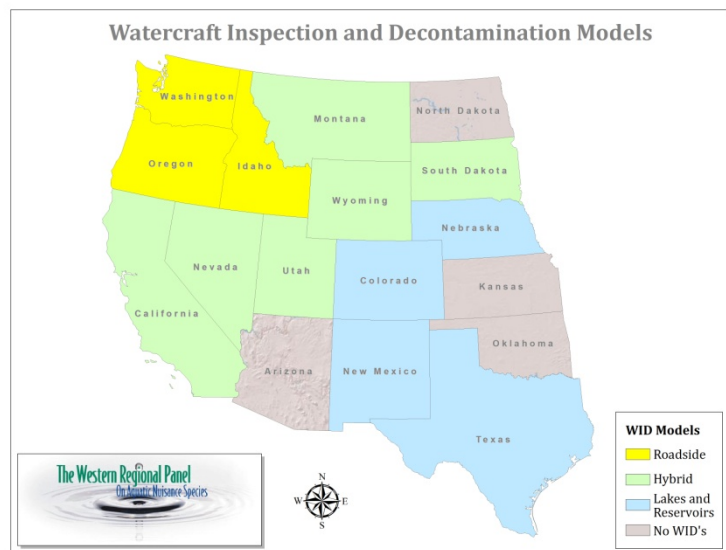
### The Mission

To protect wildlife, natural resources, recreation, infrastructure, agriculture and the economy by (1) preventing the introduction of zebra and quagga mussels, and other invasive species and (2) by containing current infestations at the source.

It is a shared goal among WID stations to protect natural resources from the harm caused by invasive species. In doing so, we are providing outstanding boating and fishing recreational opportunities for future generations and continued ability to move water in the arid West.

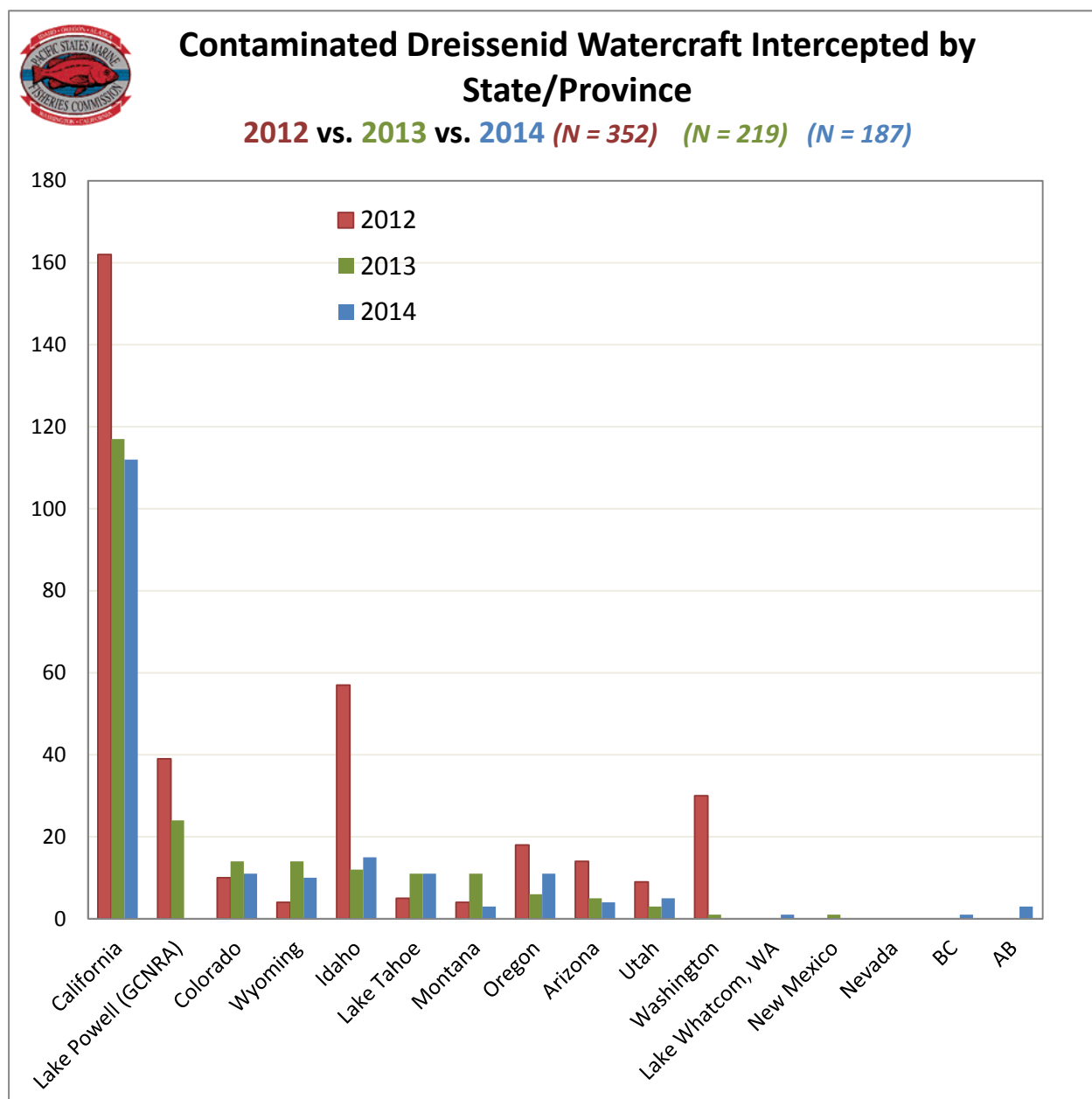
### Background

WID programs have been implemented in the west since the early 2000's. However, it wasn't until after Lake Mead found quagga mussels in 2007 that managing agencies began utilizing WID stations as a primary management tool to reduce the risk of introduction by mitigating the single largest vector of spread – hitchhiking on recreational watercraft. Most, but not all, states west of the 100<sup>th</sup> Meridian now have WID stations, and some eastern states do as well. These programs really do work to stop the continued inoculation of our waters with harmful zebra and quagga mussels, or other AIS!



Map produced by Colorado Parks and Wildlife, 2016

## Mussel Boat Interception Data - 2013

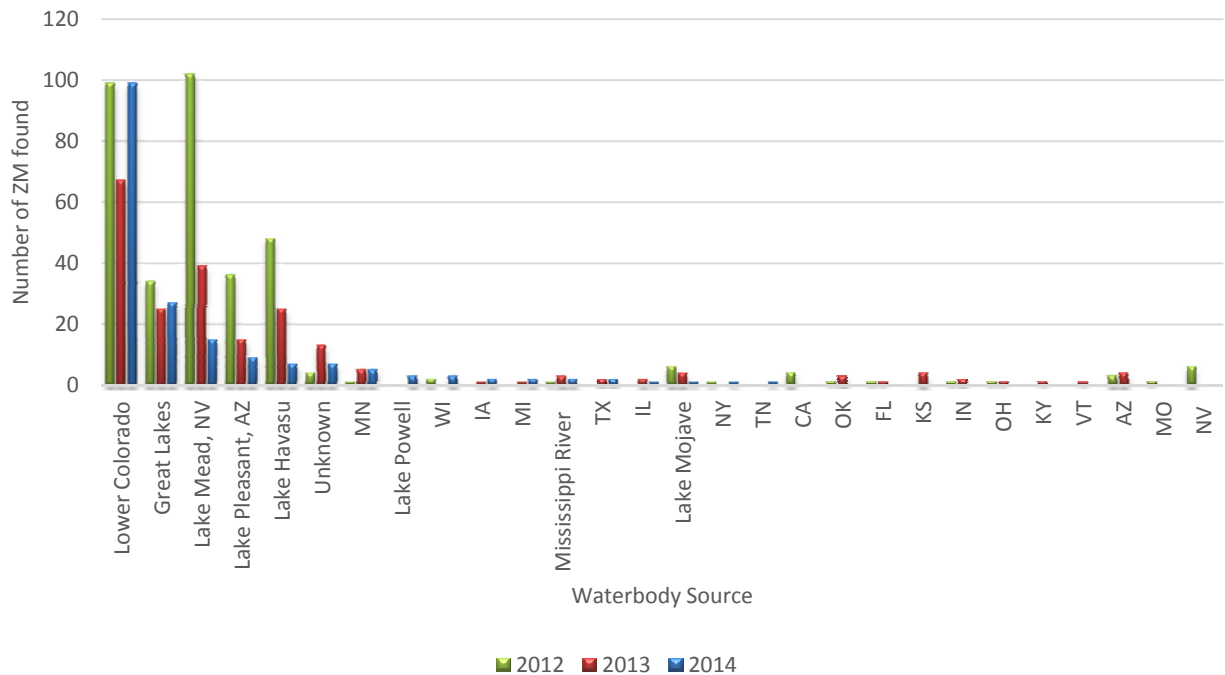






## Source of Intercepted Watercraft with Adult Dreissenid Mussels 2012-2014

For: CA,OR, ID, MT, WA, WY, NV, UT, CO, AZ, TRPA, BC, AB, NM  
N = 352 (2012), 219 (2013), 187 (2014)



## State Specific Program Information

For detailed information about a specific state program, please visit the website or call the number listed below.

**Western States Boat Inspection Information**  
**We're All in This Boat Together**

<b>Alaska:</b> Dept of Fish & Game <a href="http://www.adfg.alaska.gov/index.cfm?adfg=invasive.main">www.adfg.alaska.gov/index.cfm?adfg=invasive.main</a>	(907)465-6183
<b>Arizona:</b> Game and Fish Dept <a href="http://www.azgfd.gov/ais">www.azgfd.gov/ais</a>	(623)236-7608
<b>California:</b> Dept of Fish & Wildlife <a href="http://www.dfg.ca.gov/quaggamussel">www.dfg.ca.gov/quaggamussel</a>	(866)440-9530
<b>Colorado:</b> Parks & Wildlife <a href="http://www.cpw.state.co.us">www.cpw.state.co.us</a>	(303)291-7295
<b>Idaho:</b> Dept of Agriculture <a href="http://www.invasivespecies.idaho.gov">www.invasivespecies.idaho.gov</a>	(877)336-8676
<b>Kansas:</b> Dept of Wildlife, Parks & Tourism <a href="http://www.protectKSwaters.org">www.protectKSwaters.org</a>	(620)342-0658
<b>Lake Tahoe:</b> AIS Program <a href="http://www.TahoeBoatInspections.com">www.TahoeBoatInspections.com</a>	(888)824-6267
<b>Montana:</b> Dept of Fish, Wildlife & Parks <a href="http://fwp.mt.gov/fishing/guide/AIS">fwp.mt.gov/fishing/guide/AIS</a>	(406)444-2449
<b>Nebraska:</b> Invasive Species Program <a href="http://neinvasives.com">neinvasives.com</a>	(402)472-3133
<b>Nevada:</b> Dept of Wildlife <a href="http://www.ndow.org">www.ndow.org</a>	(775)688-1314
<b>New Mexico:</b> Dept of Game and Fish <a href="http://www.wildlife.state.nm.us/ais">www.wildlife.state.nm.us/ais</a>	(888)248-6866
<b>North Dakota:</b> Game & Fish Dept <a href="http://gf.nd.gov/ans">gf.nd.gov/ans</a>	(701)770-0920
<b>Oregon:</b> Dept of Fish & Wildlife, State Marine Board <a href="http://www.boatoregon.com">www.boatoregon.com</a>	(503)947-6000
<b>South Dakota:</b> Game, Fish & Parks <a href="http://www.sdleastwanted.com">www.sdleastwanted.com</a>	(605)223-7700
<b>Utah:</b> Division of Wildlife Resources <a href="http://www.wildlife.utah.gov/dwr/invasive-mussels.html">www.wildlife.utah.gov/dwr/invasive-mussels.html</a>	
<b>Washington:</b> Dept of Fish & Wildlife <a href="http://www.wdfw.wa.gov/ais">www.wdfw.wa.gov/ais</a>	(888)WDFW-AIS
<b>Wyoming:</b> Game & Fish Dept <a href="http://wgfd.wyo.gov/ais">wgfd.wyo.gov/ais</a>	(877)WGFD-AIS

**Expect Inspections**  
**CLEAN.DRAIN.DRY**

## **Building Consensus in the West - A Committee of the Western Regional Panel on ANS**

**This *Student Curriculum*, and the corresponding *Trainer's Manual*, are direct results of a western regional collaborative effort and are intended for broad, multi-jurisdictional, cooperative implementation. Graduates of this course are strongly encouraged to adhere to Building Consensus standards and definitions.**

The *Quagga Zebra Action Plan (QZAP) for Western Waters* was written by the Western Regional Panel (WRP) on ANS in 2009, and was approved by the ANS Task Force in February 2010. QZAP's purpose was to serve as a road map of priorities for water or recreational management entities and their partners. The plan can be found at [http://www.anstaskforce.gov/QZAP/QZAP\\_FINAL\\_Feb2010.pdf](http://www.anstaskforce.gov/QZAP/QZAP_FINAL_Feb2010.pdf). The highest priorities are to contain the current infestations of quagga mussels in the west, and to prevent new introductions through the implementation of watercraft inspection and decontamination (WID) stations.

In an effort to facilitate implementation of QZAP, western state and federal AIS coordinators gathered in Phoenix on August 22-23, 2012 alongside their Assistant Attorneys General and Law Enforcement of Chiefs. The co-learning workshop was titled "Legal and Regulatory Efforts to Minimize Expansion of Invasive Mussels through Watercraft Movements". Coordinating with Attorneys General allowed the group to create action plans that could work within the available legal frameworks in the West to minimize the expansion of invasive mussels through watercraft movements in the western United States.

One year later, the Western State AIS Coordinators, gathered in Denver for a workshop titled "*Building Consensus in the West—A Multi-State Vision for Watercraft Inspection and Decontamination Programs*". The workshop advanced three specific items from the Phoenix Action Plan related to developing standard definitions and criteria and model statutory/regulatory language to implement a comprehensive watercraft inspection and decontamination program. The AIS Coordinators (15 of 19 present) reached consensus on the following items:

- Definitions for what constitutes early 'detection' and the minimum required to validate detection.
- Water body definitions based on detection
- Notification requirements based on detections and water body definitions.
- Triggers for states to implement management (resource dependant)
- De-listing timelines for suspect, positive and infested water bodies.
- Definitions for Self-Inspection, Inspection, Decontamination, Authorized Agent, Authorized Location, Quarantine, Impound, Exclusion and Seals/Receipts.

The following winter, the *Building Consensus in the West* group gathered again in Denver, Colorado on February 11–13, 2014. A total of 25 individuals representing western AIS Coordinators, Assistant Attorneys General, law enforcement supervisors, and others convened to further action items from the previous meeting. Specifically, the group sought to:

- Reach consensus on training and certification minimum standards.
- Generate guidelines for quality control of WIDS.
- Finalize the model law.
- Agree upon frequency, quantity and quality of sampling to support listing and de-listing.

- Agree upon materials that would be provided to certified inspectors and trainers.
- Agree upon minimum standards for seals and receipts.
- Further the ongoing effort to establish data sharing for WIDS.

Another product of this effort is the “*Preventing the Spread of Aquatic Invasive Species by Recreational Boats: Model Legislative Provisions & Guidance to Promote Reciprocity among State Watercraft Inspection and Decontamination Programs* (available at <http://nsglc.olemiss.edu/projects/model-legal-framework/index.html>). The model law was approved by Association of Fish and Wildlife Agencies in March 2014 and published by the National Sea Grant Law Center. This documentation of the optimal legal basis for WID stations and it serves two purposes: (1) offer guidance to entities that do not have WID programs that wish to gain the legal framework to authorize new programs, and (2) provides standards for entities with current WID programs required to create a foundation for multi-state reciprocity.

As a result of the *Building Consensus in the West* effort, in 2014, Colorado, Wyoming and New Mexico began accepting each other’s AIS boat seals and receipts. The three bordering states agreed that inspectors be trained alike, follow the same field procedures, and are held to the same quality control standard. The pilot is being evaluated in relation to broadening reciprocity in future years.

The effort is ongoing and future topics for discussion include education and outreach, and collaborating with boat manufacturers to set standards which reduce risk of transporting AIS on watercraft. For detailed information about Building Consensus and to view the workshop materials, please visit <http://seagrant.oregonstate.edu/invasive-species/invasive-mussels-west#current> or [www.westernais.org](http://www.westernais.org).

## Water Body Listing and De-Listing

Positive identification of zebra or quagga mussels must adhere to the state procedure. Waters in which the presence of zebra or quagga mussels has been identified are broadly called “**detected waters**”.

The minimum criteria for detection are 2 independent results from the same sample using scientifically accepted techniques (e.g. microscopy, PCR, gene sequencing, taxonomic identification). The *Building Consensus Committee* created classifications to identify water bodies based on early detection sampling. The definitions for detected waters are listed below:

Management  
Trigger →

- **Undetected/Negative** - sampling/testing is ongoing and nothing has been detected, or nothing has been detected within the time frames for de-listing.
- **Inconclusive** (temporary status) - Water body has not met the minimum criteria for detection (e.g. a single eDNA hit).
- **Suspect** – Water body that has met the minimum criteria for detection.
- **Positive** – Multiple (2 or more) subsequent sampling events that meet the minimum criteria for detection.
- **Infested** – A water body that has an established population of AIS.



*Building Consensus* also set standards timelines for de-listing detected waters, as detailed below. The timeline for de-listing is below:

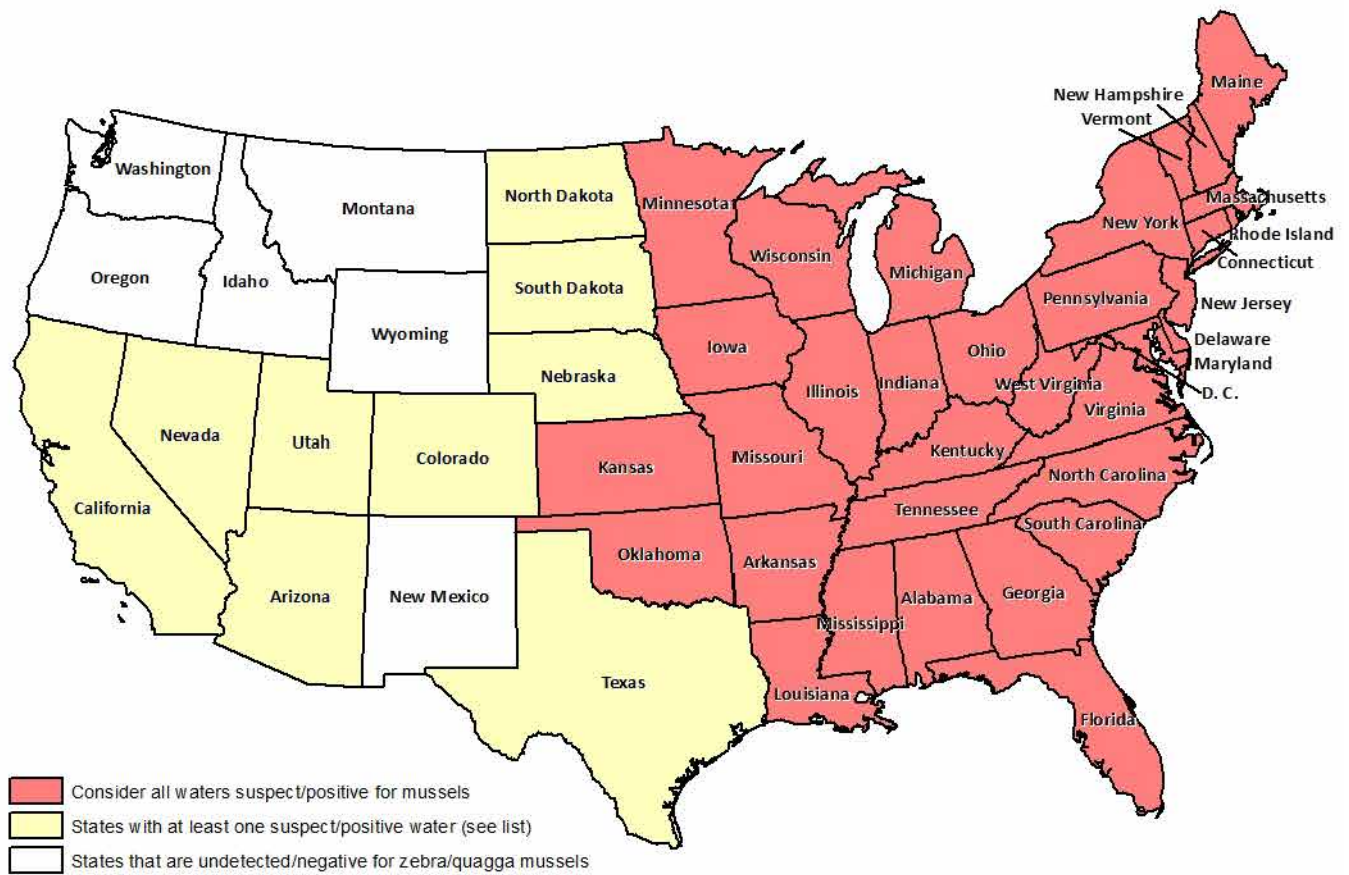
- **Inconclusive** – 1 year of negative testing including at least one sample taken in the same month of subsequent year as the positive sample (accounting for seasonal environment variability) to get to undetected/negative.
- **Suspect** – 3 years of negative testing to get to undetected/negative.
- **Positive** – 5 years of negative testing to get to undetected/negative.
- **Infested** – Following a successful eradication or extirpation event including a minimum of 5 years post-event testing/monitoring with negative results to get to undetected/negative.



*Lake Mead is infested with Quagga Mussels*

Map on the next page was produced by WY Game and Fish, January 2015  
For the most up to date map visit <http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/>

## Where are Mussels?



### ARIZONA

Colorado River  
Imperial Res. (AZ & CA)  
Lake Havasu (AZ & CA)  
Lake Mead (AZ & NV)  
Lake Mohave (AZ & NV)  
Lake Pleasant  
Lake Powell (AZ & UT)  
Martinez Lake  
Mittry Lake  
Topock Marsh

### CALIFORNIA

Anaheim Lake  
Black Gold golf course pond (Yorba Linda)  
Coachella Canal  
Colorado River  
Copper Basin Reservoir  
Dixon Lake  
El Capitan Reservoir  
Imperial Reservoir (AZ & CA)  
Irvine Lake  
Kraemer Basin Reservoir  
Lake Cahuilla  
Lake Forest 1  
Lake Forest Keys (Lake Forest 2)  
Lake Havasu (AZ & CA)  
Lake Jennings  
Lake Matthews

### CALIFORNIA (cont.)

Lake Miramar  
Lower Otay Lake  
Lake Piru  
Lake Poway  
Lake Ramona  
Lake Skinner  
Murray Reservoir  
Olivenhain Reservoir  
Piru Creek  
Rattlesnake Reservoir  
Ridgemark golf course (Hollister)  
San Justo Reservoir  
San Vicente Reservoir  
Shadow Lake Estates  
Sweetwater Reservoir  
Walnut Canyon Reservoir

### COLORADO

Pueblo Reservoir

### NEBRASKA

Offutt Base Lake  
Zorinsky Reservoir

### NEVADA

Colorado River  
Lake Mead  
Lake Mohave (AZ & NV)

### NORTH DAKOTA

Red River

### SOUTH DAKOTA

Angostura Reservoir  
Lewis and Clark Lake

### TEXAS

Lake Belton  
Lake Bridgeport  
Lake Lavon  
Lake Ray Roberts  
Lake Texoma  
Lake Waco  
Lewisville Lake

### UTAH

Lake Powell (UT & AZ)  
Deer Creek Reservoir

### CANADA

Lake Winnipeg (Manitoba)

## WID Quality Control

Entities that are performing WID are also encouraged to perform quality control or assurance evaluations. The goal is to ensure procedures are being followed and stations are adequately stocked with educational materials and proper signage to ensure that boaters get consistent, timely and accurate information from inspectors. This also provides an opportunity for performing on the job training to inspectors and supervisors. Quality control may include secret shopper evaluations, customer service phone evaluations, announced site visits and on the job training. Examples of quality control forms will be used in this course during outdoor sessions and are available for use.

## Research

Continuing to search for new control methods and additional technologies to stop the spread of AIS is a high priority for most managers. A recent collaborative project completed by the WRP's Recreational Ballast Tank Committee was performed by the University of Nevada Reno. The objective was to test the efficacy of a filtration device to minimize the introduction of veligers or zooplankton into the ballast water system of recreational watercraft, and minimize transportation and potential spread into negative lakes and reservoirs. It was funded by the U.S. Fish and Wildlife Service, PSMFC, California Department of Fish and Wildlife and Colorado Parks and Wildlife. The project was coordinated by the Tahoe Regional Planning Agency in partnership with the Water Sports Industry Association (WSIA). The study concluded in January 2014 and was later presented to the Western State AIS Coordinators and the Western Regional Panel's Executive Committee. In February, the filter "Mussel Mast'R" was unveiled at the WSIA conference in Steamboat Springs, Colorado.



A press release dated February 22, 2014 stated:

*"The new "patent pending" system effectively filters out aquatic invasive species and their larvae before allowing them to be pumped into ballast tanks or bladders commonly used in boats designed for wakeboarding and other wake sports."*

The WRP is continuing to work with all the project partners to further production, research and development of new technologies to reduce the likelihood of invaders hitchhiking on watercraft. This filter, and other new technologies, could reduce the risk of veligers being transported on watercraft and eliminate the need for decontamination in certain situations, which would greatly increase the efficacy of WID stations and reduce costs. The WRP and its member agencies do not endorse specific products or companies. This information is presented as an example of efforts by the boating industry to help combat the spread of AIS.



## Chapter 1 Review Questions

1. What are Aquatic Invasive Species (AIS)?

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2. Name three AIS we are concerned about?

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3. Our shared mission is to protect wildlife, natural resources, recreation, infrastructure, agriculture and the economy by:

- a. Preventing the introduction of ZQM and other invasive species
- b. Containing current infestations/introductions
- c. Stopping the spread of invaders to new waters
- d. All of the above

4. Fill in the blank next to the following definitions with the letter of the corresponding classification.

**A. Inconclusive      B. Positive      C. Suspect      D. Infested      E. Negative**

\_\_\_ Testing is ongoing and no evidence of Dreissena mussels has been discovered.

\_\_\_ eDNA detection with no confirmation (one hit wonder).

\_\_\_ One verified detection of mussel veliger or adults.

\_\_\_ More than one verified detection of mussel veliger or adults.

\_\_\_ A reproducing and recruiting population of mussels is established.

6. Why is education the most important aspect of being an inspector?
- a. So that boaters learn to keep their boats and equipment clean, drained, and dry and do it themselves without inspectors every single time.
  - b. Because we cannot put inspectors on all of the lakes and reservoirs all the time.
  - c. The best way to change a behavior is through education
  - d. All of the above

7. What are the minimum criteria for detection?

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8. Which state intercepted the most infested watercraft in 2013?

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9. Where was the highest amount of infested watercraft coming from in 2013?

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10. Quality control programs are encouraged and can include secret shopper, customer service phone evaluations, announced visits and on the job training.

True or False

11. Define the Certification levels provided:

Level 1 = \_\_\_\_\_

Level 2 = \_\_\_\_\_

Level 3 = A Separate Course = \_\_\_\_\_

12. What new technology was researched and implemented in 2014 to reduce the spread of zebra or quagga mussel veligers, and other plankton, in standing water on boats?
- a. Anti-fouling paint made of chili peppers
  - b. The Mussel Mast'R ballast filter
  - c. UV injection system in engines

## Chapter 2 - Zebra and Quagga Mussel Biology

It is important for inspectors and decontaminators to understand mussel ecology to both answer questions from the public or partner agencies, and to be best equipped to find mussels attached to watercraft or equipment. The training program and field procedures is grounded in the biology of this species. For example, all watercraft should be CLEAN (to prevent moving adults or settlers), DRAIN and DRY (to prevent moving microscopic veligers in water).



### Identification of Invasive Mussels

Quagga mussels (*Dreissena bugensis*) and zebra mussels (*Dreissena polymorpha*) are small freshwater bivalve mollusk-animals with two shells. They are relatives of clams and oysters. It is very difficult for a non-expert to tell the two species apart. The shell color of both mussels alternates between a yellowish and darker brown, often forming stripes. Color patterns are highly variable and can be attributed to environmental factors. They range in size from microscopic up to about two inches long.

Several diagnostic features aid in identification. Quagga mussels have a rounded angle, or carina, between the ventral and dorsal surfaces. They also have a convex ventral side that can sometimes be distinguished by placing the shells on a flat surface. The quagga mussel will topple over when stood on its ventral side, whereas a zebra mussel will not topple due to a more triangular shape. Quagga mussels also have a small byssal groove on the ventral side near the hinge. They also have asymmetrical valves when viewed from the front or ventral side.

Unlike native North American freshwater mussels, which burrow in soft sediment, adult zebra and quagga mussels can attach to most hard and semi-soft surfaces via tiny threads called byssal threads. Native species do NOT have byssal threads! These **byssal threads** are one of three main invasive characteristics that give zebra and quagga mussels an advantage over natives, along with **rapid reproduction** and their ability to **filter feed** at amazing rates.

### Ecology of Zebra and Quagga Mussels

Both zebra and quagga mussels can survive cold waters, but cannot tolerate freezing. They can endure temperatures between 33° - 86°F (1° - 30°C). Zebra mussels need waters above 54°F (12°C) to reproduce, while quagga mussels can reproduce in waters as cold as 48°F (9°C). Adult mussels are light sensitive and prefer to live in water around 200 to 300+ feet deep. They are able to live in a wide range of conditions including oxygen-depleted water.

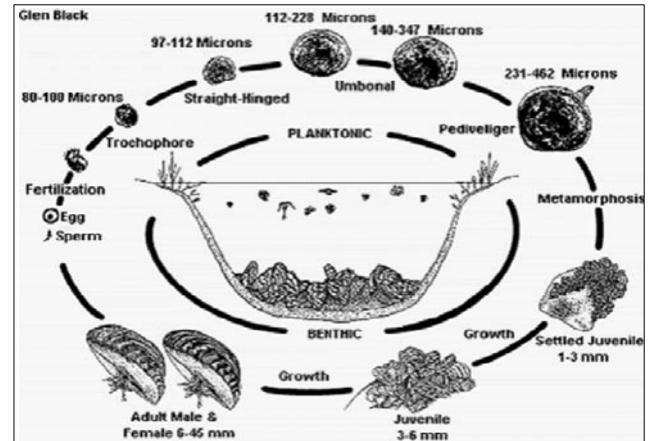
In locations where quagga and zebra mussels live together, it seems that quagga mussels

have begun to out-compete zebra mussels. In lakes where zebra mussels once constituted 98% of mussels, now are represented by 97% quagga mussels. Quagga mussels have the ability to settle in greater depths and in colder temperatures than zebra mussels. Quagga mussels have been found as deep as 540 feet in Lake Michigan!

### Life Cycle

It is important that inspectors understand the life cycle of ZQM because the inspection, decontamination and sampling/listing procedures are based in their biology. ZQM have three life cycles; (1) veligers, (2) settler juvenile stage and (3) adult stage.

1. The embryos are microscopic larvae, called **veligers**. They are free-floating plankton in the water column and impossible to see with the naked eye. The veligers float in the water column or are carried in the current for about four to eight weeks.
2. The veligers undergo metamorphosis and develop shells while settling out of the water column onto a solid surface (which could include a grain of sand, rock, wood, metal, or the skin or shells of native aquatic species). This juvenile form of the mussel is known as the **settler** stage. At this point in their life cycle, they settle into the deep benthic zone of the water column.



3. Upon maturation, **adult** mussels are sessile, meaning fixed in one place or immobile. They are attached semi-permanently with their byssal threads. Adult mussels typically form dense clusters in which they pile up on top of each other essentially smothering the generation beneath them. Their typical lifespan is four to five years.

### Where Do Mussels Like To Hide?

Right Angles. Wet or Moist Places. Rough Surfaces. Below the waterline. Shaded places.

### Where Did They Come From?

Zebra mussels are native to the Black, Caspian and Azov Seas of Eastern Europe. They were discovered in the Great Lakes in Lake St. Clair in 1988 and have since spread to 33 states.

Quagga mussels are native to the Dnieper River Drainage in the Ukraine. They were discovered first in the Great Lakes in the Erie Canal and Lake Ontario in 1989 and have since spread to 33 states in the United States.

### How Did They Get Here?

Many aquatic invasive species, including zebra and quagga mussels, have been introduced into the Great Lakes in the discharged ballast water of ocean-going ships. Another method of dispersal from Europe to the United States is believed to be through transportation of attached mature adults on anchors stored internally in compartments on transoceanic vessels. Once in North American waters, aquatic invasive species often hitch rides to other bodies of water on the boats, trailers, and equipment that people transport from place to place for commercial or recreational uses. Boaters and anglers can inadvertently transport AIS on waders and in bait buckets and live wells.

Zebra and quagga mussels likely made their way to the western USA on trailered watercraft. The Continental Divide separates the east and west in which water flows in opposite directions. The only way mussels could have made it past the Divide is by traveling overland as hitchhikers. The first discovery west of the 100<sup>th</sup> Meridian was in Lake Mead in 2007. The invasive quagga mussels found in Lake Mead in 2007 were 1,000 miles farther west than any other known colony of quagga mussels at the time. The primary method of overland dispersal of these mussels is through human-related activities, especially trailered watercraft. Given their ability to attach to hard surfaces and survive out of water for extended periods (30 days!), many infestations have occurred by adult mussels hitching rides on watercraft. The microscopic larvae also can be transported in bilges, ballast water, live wells, engines, or any other equipment that holds water.

### Impacts

Zebra and quagga mussels pose a great ecological and financial threat to the nation. They cost millions of dollars to mitigate, and are nearly impossible to eliminate. The invasion of these mussels can affect every person in some way and the impacts could be devastating.

### Why Be Concerned?

- Ecological Impacts
- Recreational Impacts
- Economic Impacts
- Social Impacts
- Industrial Impacts
- Agricultural Impacts
- Impair Water Infrastructure

### Invasive Characteristic #1 - Prolific Reproduction

Zebra and quagga mussels reproduce *exponentially*. They can spawn year-round if conditions are favorable. A single female mussel can produce up to one million eggs! Even if only ten percent of the offspring survive, there would be ten septillion mussels in the waterway at the end of five years! As the mussel population explodes, they cover the bottom and sides of the waterway.

### **Invasive Characteristic #2 - Byssal Threads**

As mentioned before, zebra and quagga mussels can attach via byssal threads to any stable substrate in the water column such as; rock, aquatic plants, artificial surfaces (cement, steel, rope, etc.), crayfish, native clams, and each other. They attach to most underwater structures and can form dense clusters that impair facilities and impede the flow of water. They clog intake pipes and trash screens, canals, aqueducts, and dams - disrupting water supply to homes, farms, factories, and power plants. Zebra and quagga mussels also degrade water quality and can alter the taste and smell of drinking water.



Byssal threads are made up of proteins and are secreted from a gland inside the mussel. Scientists have identified three types of byssal threads in zebra and quagga mussels: belaying, temporary, and permanent. Belaying byssal threads are 20-30 times the length of the mussel and are used by relocating juvenile and adult mussels to reach out and attach to surfaces. Juvenile and small adult mussels also produce temporary byssal threads in order to move and relocate. These threads are thinner, longer and attach in a tripod shape for greater stability. Permanent byssal threads are grown and an enzyme is secreted to release the temporary threads. Permanent byssal threads form within a few minutes after attaching.

### **Invasive Characteristic #3 - Filter Feeding**

Invasive species have the ability to change aquatic ecosystems, including native plant and animal communities. As filter feeders, these species remove large amounts of microscopic plants and animals that form the base of the food chain, leaving little or nothing for aquatic species. The amount of food the mussels eat and the waste they produce has life-altering effects on the ecosystem and can harm fisheries. Zebra mussels attach to and encrust native organisms, essentially smothering them and removing more animals from the food chain. Zebra and quagga mussels are one of the few species that have the ability to crash the entire food web by removing the base of the food chain – plankton – and by smothering benthic organisms that are a source of food for larger fish.



Filter feeders reject unwanted mucous covered food from their body known as pseudofeces. Pseudofeces accumulate and create an unsuitable environment. As waste from the mussels decomposes, oxygen availability is depleted, and the pH becomes very acidic causing toxic byproducts to be produced. The accumulation of organic pollutants within the tissue of the mussel is passed up the food chain, causing increased exposure by wildlife.



While filter feeding, zebra and quagga mussels absorb and excrete heavy metals and other toxic substances. These high concentrations of toxins can be ingested by other aquatic organisms and work their way up the food chain, poisoning other animals and even humans.

### Recreational impacts.

Invasive mussels encrust docks and boats. Attached mussels increase drag on boats and can even sink navigational buoys with their weight. Veligers or settlers can get sucked up into the engine cooling system and clog the engine from the inside causing it to overheat and be damaged. Increased hull and motor fouling will result in increased maintenance costs on vessels moored for long periods of time. Continued attachment of mussels



can cause corrosion of steel and concrete affecting its structural integrity. Zebra and quagga mussels impact fish populations and reduce sport-fishing opportunities. Their sharp shells can cut the feet of unsuspecting swimmers and beach goers.

### Economic impacts.

As maintenance costs for power plants, water treatment facilities and water delivery infrastructures increase, so does the cost of food and utilities. In the Great Lakes area, maintenance costs in water treatment plants, power plant intakes and dams have been in the billions of dollars. The destruction of native fisheries also has a wider economic impact in terms of tourism and recreation dollars not spent. Marinas and watercraft dealers could suffer business declines. Lakeside homeowners have experienced decreased property values following invasion.

### Management

The eradication of zebra mussels first occurred in a closed, isolated 12-acre quarry in Virginia in the 90's. A large volume of potassium chloride chemical was used to treat the water and kill the adults and larvae. Eradicating or treating zebra or quagga mussels in large water bodies and/or connected waterways is truly not possible because it could kill other aquatic life forms. Pre-chlorination has been tried but the amounts used to treat an area could reach hazardous levels. Predation from migratory diving ducks, fish species, and crayfish may reduce mussel abundance but not for any substantial length of time, so prevention is very important.

***If watercrafts are cleaned, drained, and dried in between water bodies, any attached mussels or other AIS will be eliminated.***

The rapid invasion of United States waterways has been attributed to the mussel's ability to disperse during all stages of its life. Mussels can spread to other bodies of water by attaching



to watercraft hulls and anchors, trailers, and fishing equipment. Larvae can be transported in bilge water, ballast water, engines, or live bait wells. Mussel larvae also disperse naturally, and can be carried by water currents to other lakes or reservoirs downstream or through water diversions.

Since there are no viable control methods once mussels are introduced in open water bodies, prevention is our only defense. As a watercraft inspector, **your most important task is educating the public** both coming into and exiting the lake/reservoir, or state. Many lakes and reservoirs will not have inspections, therefore, it is essential that inspectors:

- 1—Show the boaters how to inspect their boats themselves.
- 2—Explain why inspection is critical to find mussel settlers and other AIS.
- 3—Impress on the boater how zebra and quagga mussels damage boats, ruin fishing opportunities, harm the environment and impair water infrastructure.

Inspectors need to drive home the primary education message to **Clean/Drain/Dry** and explain why boaters need to do it **each time** they use their watercraft. Teaching boaters and anglers to clean, drain, dry their boats and gears themselves in between each and every launch is invaluable! If boaters and anglers do this, mussels and other AIS will not spread!



## Other A.I.S. Biology

As inspectors learned in the introduction module, there are many species of aquatic plants and animals that are invasive. The watercraft inspection and decontamination program prevents all AIS from being introduced into new waters.

Boat inspectors have detected New Zealand mudsnails, Eurasian watermilfoil and rusty crayfish on, or in, watercraft over the past few years. While zebra and quagga mussels are the main focus, these procedures are aimed at protecting resources from all invaders being transported on watercraft.



## **\*Outdoor Demonstration – How Many Mussels Can You Find?\***

*Write Down All The Places You Found A “Mussel” On The Watercraft:*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_



## Asian Clams (*Corbicula fluminea*)

### A Zebra/Quagga Mussel “Look-a-Like” Invader

Asian clams are small non-native bivalves that are commonly mistaken for zebra and quagga mussels. Because it is often observed littering the beaches with expansive shells, it is commonly confused with zebra or quagga mussels. Its shells have striations (or ridges) which give it the appearance of having stripes.

Asian Clams	Zebra or Quagga Mussels
<b>Ridges</b> or Striations on Shells	<b>Smooth</b> Shells with Stripes or Colorations
Does Not Have Byssal Threads	Has Byssal Threads



**Identification:** Adults can reach 50 to 65 mm in length, although 25 mm is typical. Shell is oval, but not elongated, and is deep on the hinge side. The outer layer of shell has well defined, thick growth rings and varied coloration. Older clams have a darker colored shell, while younger clams are lighter brown or tan.

**Habitat:** They prefer fast moving water because currents provide food for these suspension feeders. However, they are commonly found on the shorelines of lakes and reservoirs.

**Pathway of Introduction and Spread:** *Corbicula fluminea* is used in Asia as a food source and may have been cultivated in the United States. It is also used for fish bait—probably another way it has been spread throughout North America. It is sold in the aquarium trade as “pygmy clam”, or “golden clam.”

**Impacts:** The Asian clam invasion in North America has created problems for power plants and water canals because large numbers of clams block water intake valves. They also compete with native bivalves for food, and competition increases as Asian clam populations explode.

## New Zealand Mudsnail (*Potamopyrgus antipodarum*)

New Zealand mudsnails (NZMS) are small aquatic snails native to fresh waters of New Zealand. They were first discovered in North America in the late 1980s in the Snake River, Idaho and Madison River, Montana.

**Identification:** NZMS range in size from a grain of sand to 1/8 inch in length and are black or brown in color. The shell has about 5 ½ spirals. If the shell is held tip up with the opening toward you, the opening is on the right. There is an attached operculum (cover) which can close off the opening.

**Habitat:** Found in freshwater, brackish, or saline waters with almost any substrate. Populations in saline conditions produce fewer offspring and grow more slowly. Also tolerates a wide range of temperatures, ranging from near freezing to 82°F.



**Pathway of Introduction and Spread:** New Zealand mudsnails are spread into new river systems primarily by humans, although they can be carried on the feet of dogs and wildlife. Anglers, boaters, researchers and others can carry NZMS to uninfested locations on their boots and gear. They can survive up to 50 days on a damp surface, giving them ample time to be transferred from one body of water to another on fishing gear.

**Impacts:** NZMS compete with native invertebrates, including native mollusks, for space and food resources. NZMS may reduce the availability of native invertebrate prey for fish – particularly mayflies, caddis flies and chironomids. They are not a viable food sources themselves – their hard shell allows them to pass through a fish gut unharmed.

## Rusty Crayfish (*Orconectes rusticus*)

Rusty crayfish are native to the Ohio River Basin. They were first discovered outside of their native range in the 1960s.

**Identification:** Rusty crayfish grow up to five inches long. They have brown bodies and large grayish-green to reddish-brown claws with dark black bands on the tips. There are two rusty patches on either side of the crayfish's body. The claws, when closed, have an oval gap in the middle. The moveable claw is smooth and S-shaped. Males tend to be larger than females.



**Habitat:** Found in freshwater lakes, rivers, and streams. Prefer deep pools and fast currents with cover from predators.

**Pathway of Introduction and Spread:** Introduced by anglers who use the crayfish as bait and throw unused bait into the water or illegally stocked as a prey base for a fishery.

**Impacts:** Rusty crayfish eat small fish, insects, and fish eggs. They also eat aquatic vegetation, damaging underwater habitat that is important for fish spawning, cover, and food. They are aggressive and displace native crayfish.



## Asian Carp

The Asian carp is an invader that gets a lot of attention in the media and national forums, alongside zebra and quagga mussels. There are four species of Asian carp – bighead, silver, black and grass. In Colorado, sterile grass carp are stocked for sport and for aquatic plant control. Today, we will be learning about the highly invasive bighead, silver and black carps. Asian carp are native to China. They were first introduced in the U.S. in Arkansas in 1972 to control algae and aquatic weeds in aquaculture ponds. Bighead carp escaped from aquaculture farms during flooding in 1994 and spread throughout the Mississippi basin.



**Habitat:** They prefer large rivers, but can also be found in smaller rivers and streams, as well as lakes and ponds. They can also survive in a wide range of temperatures, but their preferred temperature is 78°F.

**Pathway of Introduction and Spread:** Once in open waters, bighead carp can spawn and disperse themselves. Juvenile bighead carp are popular as bait and infestations may be caused by dumping unused bait into the water. Live aquatic bait is transported on watercraft.

### Impacts:

Bighead carp are filter-feeding fish and consume plant and animal plankton, outcompeting native fish. They are voracious eaters, capable of eating 5-20 percent of their body weight each day, which causes a decline in zooplankton can also cause algae blooms. They consume plankton, stripping the food web of the key source of food for small and big fish. They can also grow to large sizes: some as large as 110 lbs, though the average size is around 30-40 lbs.

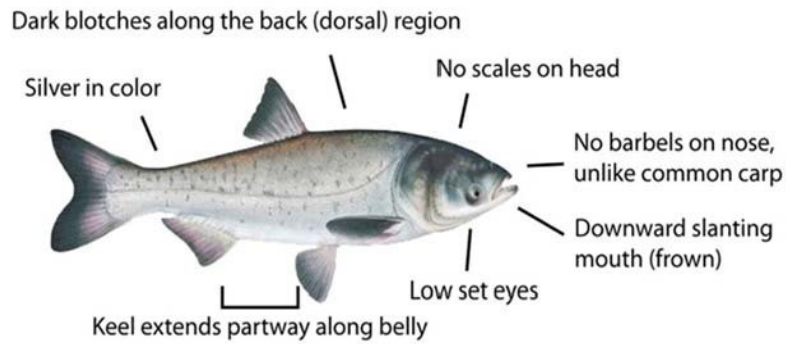


The silver carp is skittish and easily startled by the sound of a boat motor. The sound can cause the fish to leap as high as ten feet out of the water, earning them the nickname "the flying fish." Some of these fish weigh more than twenty pounds. They land in boats, damage property, and injure people.

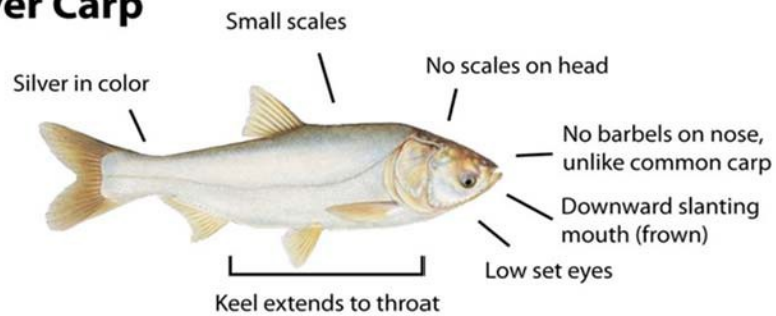
The Black Carp is different because it is not a filter feeder. It consumes primarily mollusks and is a threat to native mussel populations. They can grow up to 7 feet in length and over 100 pounds.

## Asian Carp Identification

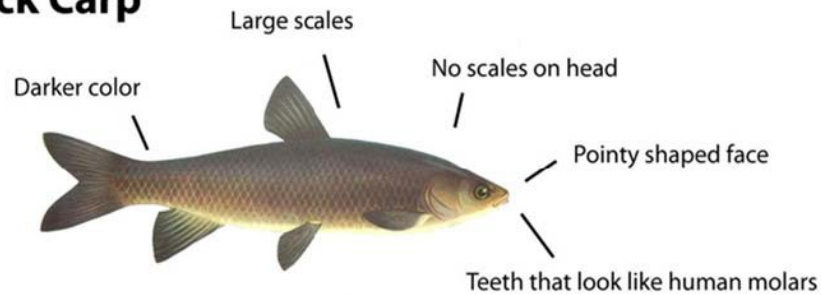
### Bighead Carp



### Silver Carp



### Black Carp





## Eurasian Watermilfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil is native to Europe, Asia, and northern Africa. It was once commonly sold as an aquarium plant and was introduced to the eastern U.S. at least as long ago as the 1940s, but it may have arrived as early as the late 1800s.

**Identification:** Eurasian watermilfoil is a submerged, rooted perennial with long, branching stems and soft feathery leaves attached in whorls of four. Each leaf has 11 to 21 pairs of leaflets, which are closely spaced, and about ½ inch long. Eurasian watermilfoil produces small yellow, four-parted flowers on a spike that projects two to four inches above the water surface.

**Habitat:** Tolerates a wide range of water conditions and depths; prefers nutrient-rich substrate.

**Pathway of Introduction and Spread:** Eurasian watermilfoil reproduces by seeds, fragmentation, and winter buds. Fragmentation and winter buds are believed to be more important in spreading the plant. Any plant fragment can start a new infestation. Winter buds are tight leaf clusters that break off and fall to the bottom, where they overwinter. In the spring, the buds grow and form new plants.

**Impacts:** Eurasian watermilfoil forms dense mats that restrict swimming, fishing, and boating and clog water intakes. The mat alters water chemistry by choking and shading out other native aquatic plants. The decaying plants decrease oxygen levels in the water and foul lakeside beaches. This disrupts the food chain and destroys habitat and food needed by fish and birds. Eurasian watermilfoil slows the flow of water in irrigation ditches and canals and creates standing water that is ideal mosquito habitat.



## Water Hyacinth (*Eichornia crassipes*)

Water hyacinth is an ornamental floating plant that was brought from Central and South America to the Cotton States Exposition in New Orleans in 1884. Visitors took these plants home and added them to private backyard ponds. This attractive plant is now considered one of the world's worst aquatic weeds.

**Identification:** Water hyacinth is a floating plant with thick, glossy, round leaves and very showy lavender flowers. Each flower has six bluish-purple petals joined at the base to form a short tube. One petal has a yellow spot.

**Habitat:** Found in freshwater lakes, rivers, ponds, and ditches.

**Pathway of Introduction and Spread:** Water hyacinth reproduces by seeds and through hundreds of daughter plants that form on rhizomes. Daughter plants that break off can be dispersed by wind and water currents or on trailered watercraft or gear. A single plant can also produce as many as 5,000 seeds, which can be transported by water, wildlife, boats, and equipment to uninfested locations. Aquarium and pond supply dealers sell water hyacinth as ornamental vegetation for private ponds. Its presence as an ornamental makes escape and growth in the wild common.

**Impacts:** Water hyacinth clogs irrigation ditches and waterways, making boating, fishing, swimming, and almost all other water activities impossible. These plants cover the water's surface in a mat-like sheet and restrict sunlight that underwater native plants need for growth. Eventually, this underwater vegetation dies, decays, and depletes oxygen from the water, killing fish and other aquatic life. Water hyacinth provides prime habitat for disease-harboring animals such as mosquitoes and parasitic flatworms. It reduces habitat for migrating waterfowl.



## Chapter 2 – Biology Review

1. Why is it important to learn ZQM biology?

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2. Which are the three characteristics of zebra and quagga mussels that make them invasive?

- a. Grow larger than most other mollusks, reproduce quickly, clear the water
- b. Attach with byssal threads, rapid reproduction, filter feeding
- c. Alter water chemistry, attach with byssal threads
- d. Feed on aquatic weed beds and reduce native plant communities, attach with byssal threads, prolific or rapid reproduction

3. The larval life stage of a mussel in which they are a free-floating planktonic organism is called a \_\_\_\_\_. These juveniles then begin to develop shells and attach to solid surfaces, which are known as the \_\_\_\_\_ stage. Upon maturation, \_\_\_\_\_ mussels are sessile, meaning fixed in one place or immobile.

4. What is the primary message we want boaters to learn?

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5. In addition to ecological impacts ZQM and other AIS cause major \_\_\_\_\_ and \_\_\_\_\_ impacts.

6. Because many lakes and reservoirs will not have inspections, it is essential to:

- a. show the boaters how to inspect their boats themselves
- b. explain why inspection is critical to find mussel settlers and other AIS
- c. Impress on the boater how zebra and quagga mussels damage boats, ruin fishing opportunities, harm the environment and impair water infrastructure.
- d. All of the above

7. Where do mussels like to hide on watercraft?

\_\_\_\_\_ angles, \_\_\_\_\_ or \_\_\_\_\_ places. \_\_\_\_\_ surfaces. Below the \_\_\_\_\_.

8. Mussel veligers are microscopic and can be transported in standing water. (Circle one)  
True or False?

9. The Asian Clam is a look-a-like invasive species. What are two characteristics that make it different than ZQM?

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15. Which group lists other AIS of concern for transportation overland on recreational watercraft?

- a. Northern Pike, Rainbow Trout, Pondweed, Brown Trout
- b. Eurasian watermilfoil, Waterflea, Rusty Crayfish, New Zealand Mudsnaills
- c. Boreal Toad, Round Goby, Rusty Crayfish, Arkansas River Darter
- d. Northern watermilfoil, Bullfrog, Boreal Toad, Purple Loosestrife

10. Name two AIS animals that are present in the West?

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11. List ways that people commonly spread New Zealand mudsnails.

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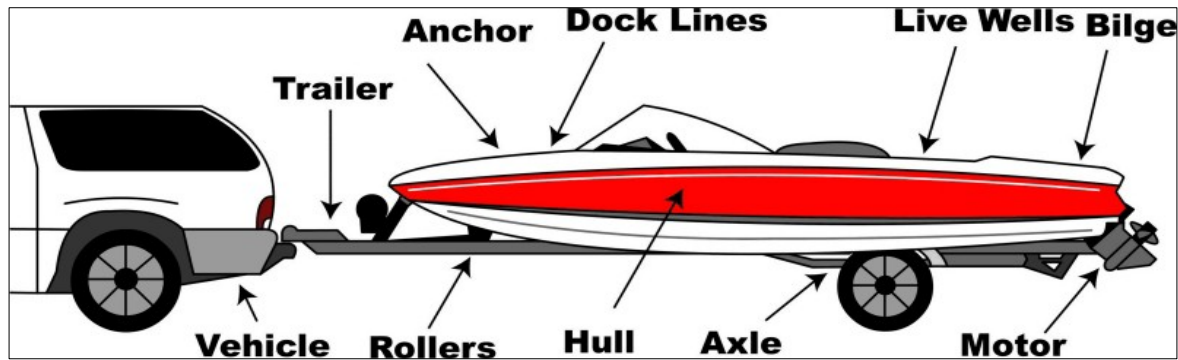
13. Rusty Crayfish eats small insects and fish eggs.      True      False      (circle one)

14. Eurasian watermilfoil \_\_\_\_\_ can spread on boats and infest new waters - which is why it's important that boats leaving EWM positive waters get inspected and don't transport plant parts.

15. This aquatic invasive plant has a beautiful purple flower with a yellow dot on one petal.

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## Chapter 3 - Watercraft 101



### Watercraft Key Terms

The following definitions are the most common terms you will need to know as an inspector.

**bait well**—An interior compartment that specifically holds live aquatic bait. Sometimes it is a separate container on the boat or incorporated in the live well compartment. May also be a pull out bucket.

**ballast tank**—A compartment within a boat, ship or other floating structure that holds water. Adding water (ballast) to a vessel lowers its center of gravity, and increases the draft of the vessel. A ballast tank can be filled or emptied in order to adjust the amount of ballast force. Small sailboats designed to be lightweight for being pulled behind automobiles on trailers are often designed with ballast tanks that can be emptied when the boat is removed from the lake or reservoir.

**bilge**—The lowest compartment on a boat where the two sides meet at the keel. The word is sometimes also used to describe the water that collects in this compartment. Water that does not drain off the side of the deck drains down through the boat into the bilge.

**bilge plug**—A plug located either on the transom wall or in the bottom of the hull that keeps lake water from entering the boat. It is removed when exiting the water body.

**bilge pump**—A water pump used to remove excessive bilge water. The water that collects in the bilge must be pumped out to prevent the bilge from becoming too full and threatening to sink the boat on the lake or reservoir

**bow**—A nautical term that refers to the forward part of the hull of a boat.

**Anti-cavitation plate**—A flat metal fitting mounted horizontally above the propeller of an outboard motor, which helps direct the flow of water into the propeller and reduces cavitation. Cavitation is the effect caused when air is drawn down into the water by a propeller, resulting in loss of power, overspending of the engine and propeller, and pitting of the metal surfaces of the propeller.

**gimbal**—A pivoted support that allows the rotation (up and down and side to side movement) of the outdrive of an I/O engine and outboard motor.

**hull**—The body or frame of a boat.

**live well**—An interior compartment found on many fishing boats that is used to keep caught fish alive. It works by pumping fresh water from the water body into the tank, as well as keeping the water aerated.

**pitot (pee-tow) tube**—A pressure measurement instrument used to measure the velocity of a boat at a given point and is usually attached to the transom.

**transducer**—An instrument that projects a sound wave into the water. When the wave strikes something such as a fish, it is reflected back and displays size, composition, and shape of the object on a screen inside the boat.

**transom**—The surface that forms the flat back panel of the stern of a boat.

**trim tabs**—The small surfaces (shelves) that are connected to the transom on a boat mostly found on cruisers, sport fishing boats and center console boats ranging from 20 feet and up.



## Marine Propulsion Systems

The purpose of this section is to inform the boat inspector about the propulsion systems that are used to power watercraft. There are: electric and gas trolling motors, outboard motors, inboard/outboard engines (I/O), inboard engines, and jet drives for jet boats and PWCs.

### Trolling Motors

An electric trolling motor is a marine propulsion system consisting of a self-contained unit that includes an electric motor, propeller and controls, and is affixed to an angler's boat, either at the bow or stern.

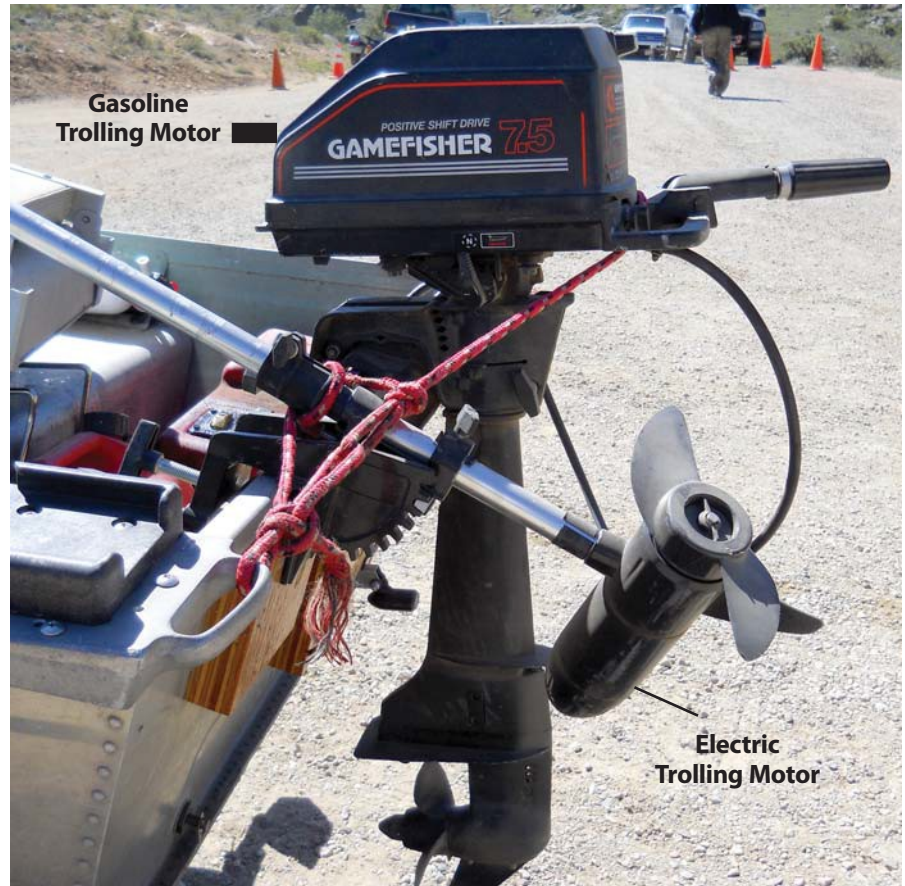
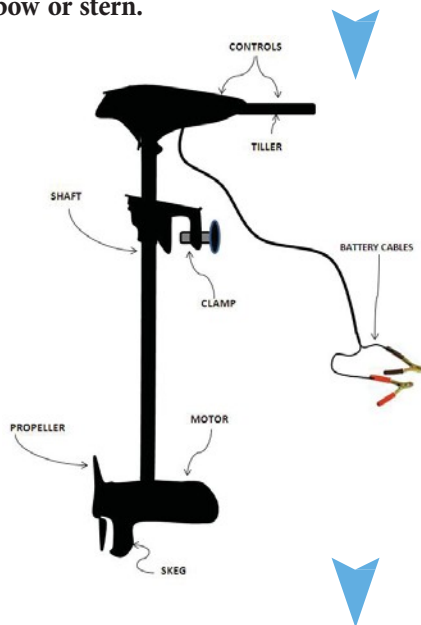
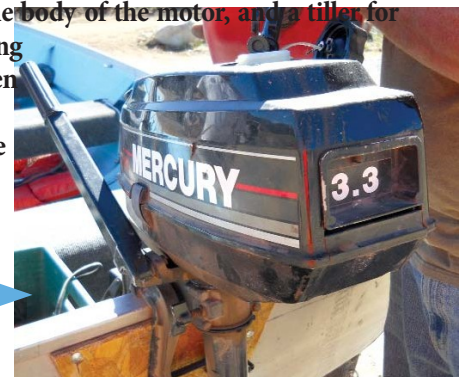


PHOTO © WIKIPEDIA

A gasoline-powered outboard, if it is not the vessel's primary source of propulsion, may also be referred to as a gasoline trolling motor. Small outboard motors are frequently used as trolling motors on boats with much larger engines that do not operate as efficiently or quietly at trolling speeds. These typically are designed with a manual pull start system, throttle and gearshift controls mounted on the body of the motor, and a tiller for steering. Trolling motors are often lifted from the water to reduce drag when the boat's primary engine is in



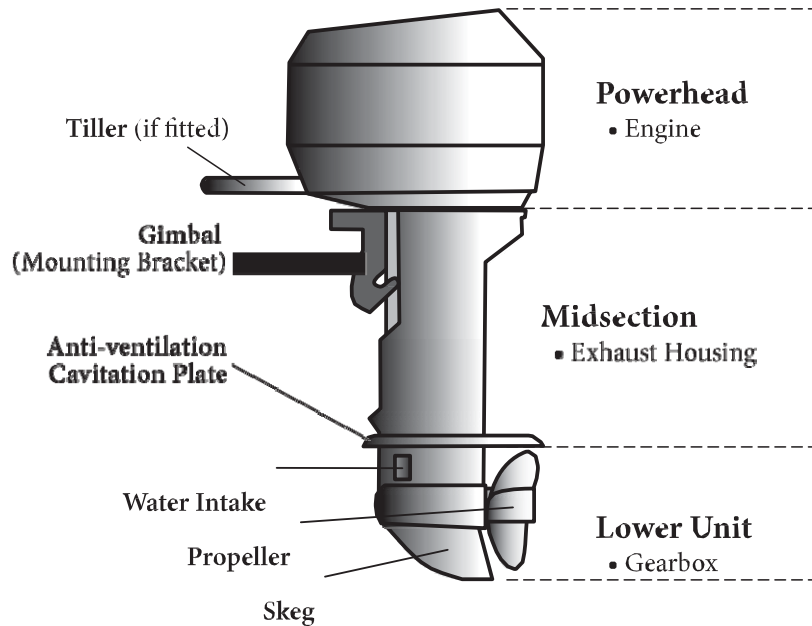


As shown in the first photo, the intakes on some of the gas trolling motors are underneath the cavitation plate. Others are so close to the edge that most mufflers do not cover them in order to perform a decontamination, as shown in the second photo.



## Outboard Motors

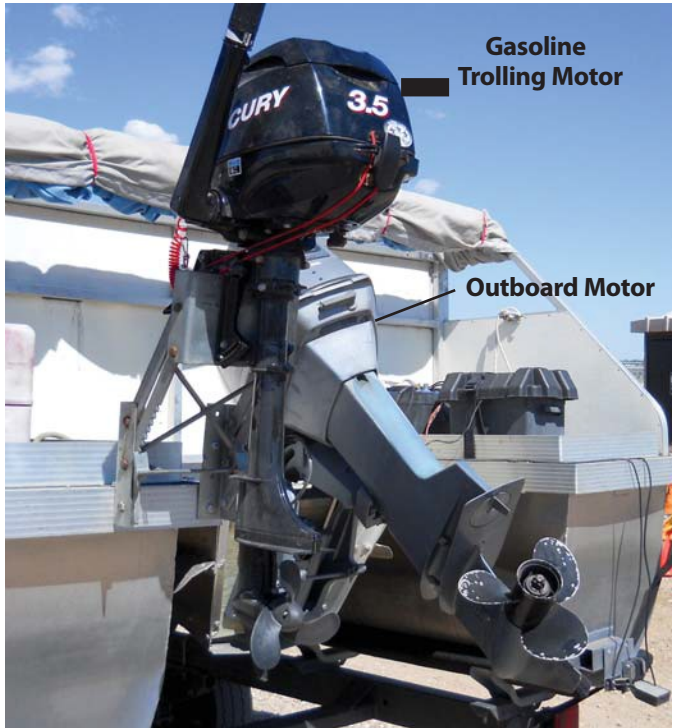
An outboard motor is a marine propulsion system for boats, consisting of a self-contained unit that includes engine, gearbox, and propeller, designed to be affixed to the outside of the transom and is the most common motorized method of propelling small watercraft. As well as providing propulsion, outboards provide steering control, as they are designed to pivot over the gimbal (mounting bracket) and control the direction of the thrust. The skeg also acts as a rudder when the engine is not running.



The intakes on this Evinrude outboard motor are only on one side and are shown as the small rectangle.



This photo shows an outboard motor on a pontoon boat with a back up gas trolling motor.



### Inboard/Outboard Engines

An inboard/outboard (I/O) engine is located inboard just forward of the transom (stern) and provides power to the drive unit located outside the hull. This drive unit (or lower unit or outdrive) resembles the bottom half of an outboard motor.

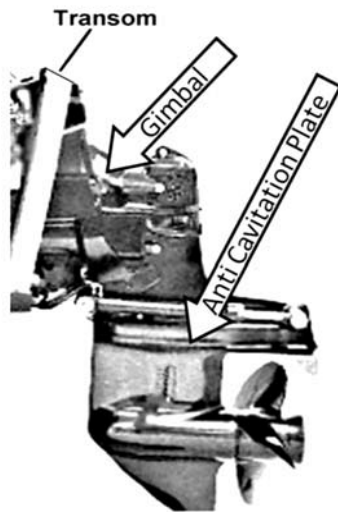


DIAGRAM © WEN BALDWIN,  
PSMFC AIS TRAINING CONTRACTOR

The following diagram demonstrates that after an I/O has exited the lake or reservoir there is water in the hose from the water inlet to the engine circulating pump.

When the engine is started in another water body, this water goes through the "cold" engine and is expelled into the water. If this water is from a positive reservoir the chance of live veligers being present in the water is very high.

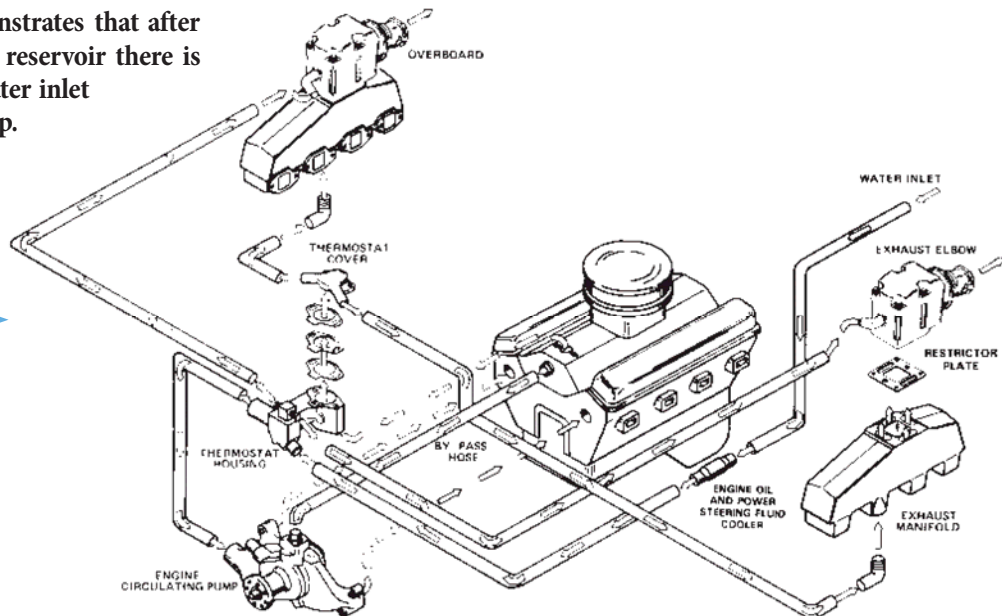


DIAGRAM © WWW.BOATPARTSTORE.COM

## Inboard Engines

An inboard engine is a marine propulsion system enclosed within the hull of the boat. Inboard engines have a raw water cooling system where water from the reservoir is pumped by the engine to cool it.

Attached to the hull of the boat is the propeller shaft and propeller which propels the boat through the water. The rudder acts as the “steering wheel” to guide the boat.

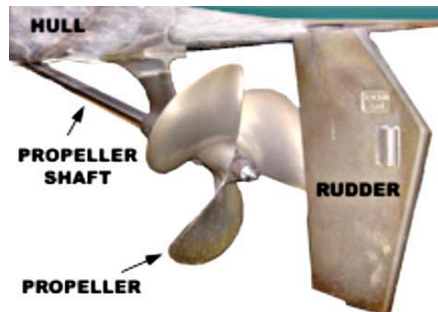


DIAGRAM © BOATCOURSE.COM

After opening the inboard engine compartment, the bilge area around the engine can be inspected and/or decontaminated for standing water.



PHOTO © GLASTRON



## Closed Cooling System Water Flow

(Closed Cooled Models)—This diagram shows how water from the reservoir/lake is circulated throughout the engine. As with the I/O, when the boat is exiting the water body, water is left in this system and is expelled into the next water body.

- |                              |                                     |
|------------------------------|-------------------------------------|
| a Exhaust Elbow              | i Check Valve                       |
| b Exhaust Manifold           | j Power Steering Cooler             |
| c Water Pump                 | k Flush Fitting (Inboard Models)    |
| d Heat Exchanger             | l Flush Connection (Inboard Models) |
| e Water Circulating Pump     | m Shaft Log Seal Connection Point   |
| f Thermostat Housing         |                                     |
| g Water Distribution Housing |                                     |
| h Cool Fuel Box              |                                     |

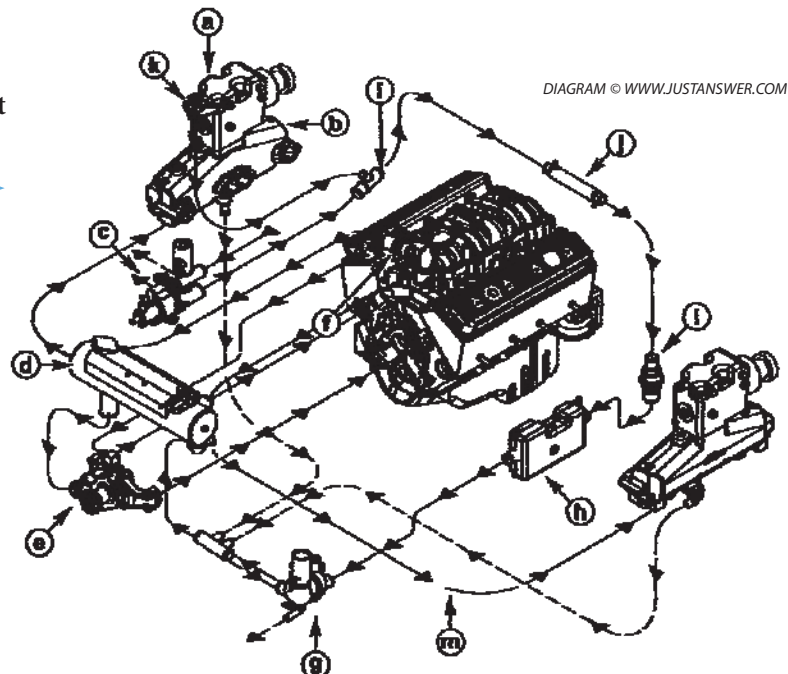


DIAGRAM © WWW.JUSTANSWER.COM



# Jet Engines

## Jetcraft

Since 1996, Jetcraft has been manufacturing fully welded, heavy gauge aluminum boats. They have two series that may be found in Colorado, the Outboard and Jet Series.

All of the models in both series have bow and anchor storage areas. All of the models in the Outboard Series have bilge pumps and trans wells. The three models of the Outboard Series that have a transom fish locker are the 2025 Discovery, 2225 Discovery, and the 2425 Discovery.



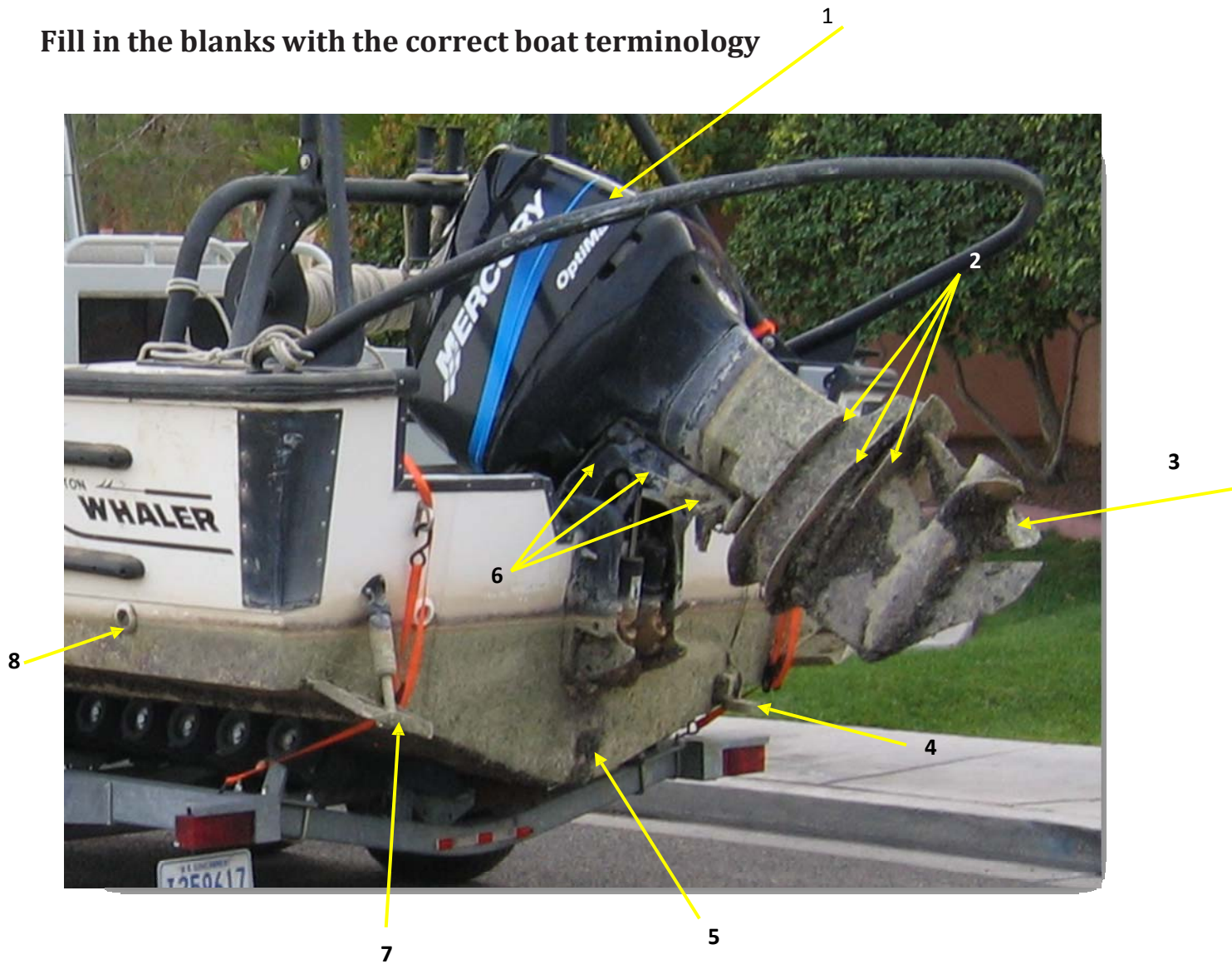
**ENGINE:** A jet boat (or sled) is a boat propelled by a jet of water ejected from the back of the craft. Unlike a powerboat or motorboat that uses a propeller in the water below

or behind the boat, a jet boat draws the water from under the boat into a pump inside the boat. The water then passes through a series of impellers and stators—known as stages—which increase the velocity of the water flow. The water is then expelled through a nozzle at the stern. Most modern jets are single stage while older waterjets may have as many as three stages. The tail section of the waterjet unit extends out through the transom of the hull above the waterline. This jet stream exits through a small nozzle at high velocity to push the boat forward.

When inspecting or decontaminating a jet boat, the boat inspector should locate the intake port on the bottom of the hull. Also, as with a PWC, inboard, or inboard/outboard engine, the engine compartment must be inspected/decontaminated.



Fill in the blanks with the correct boat terminology



1. (engine type) \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

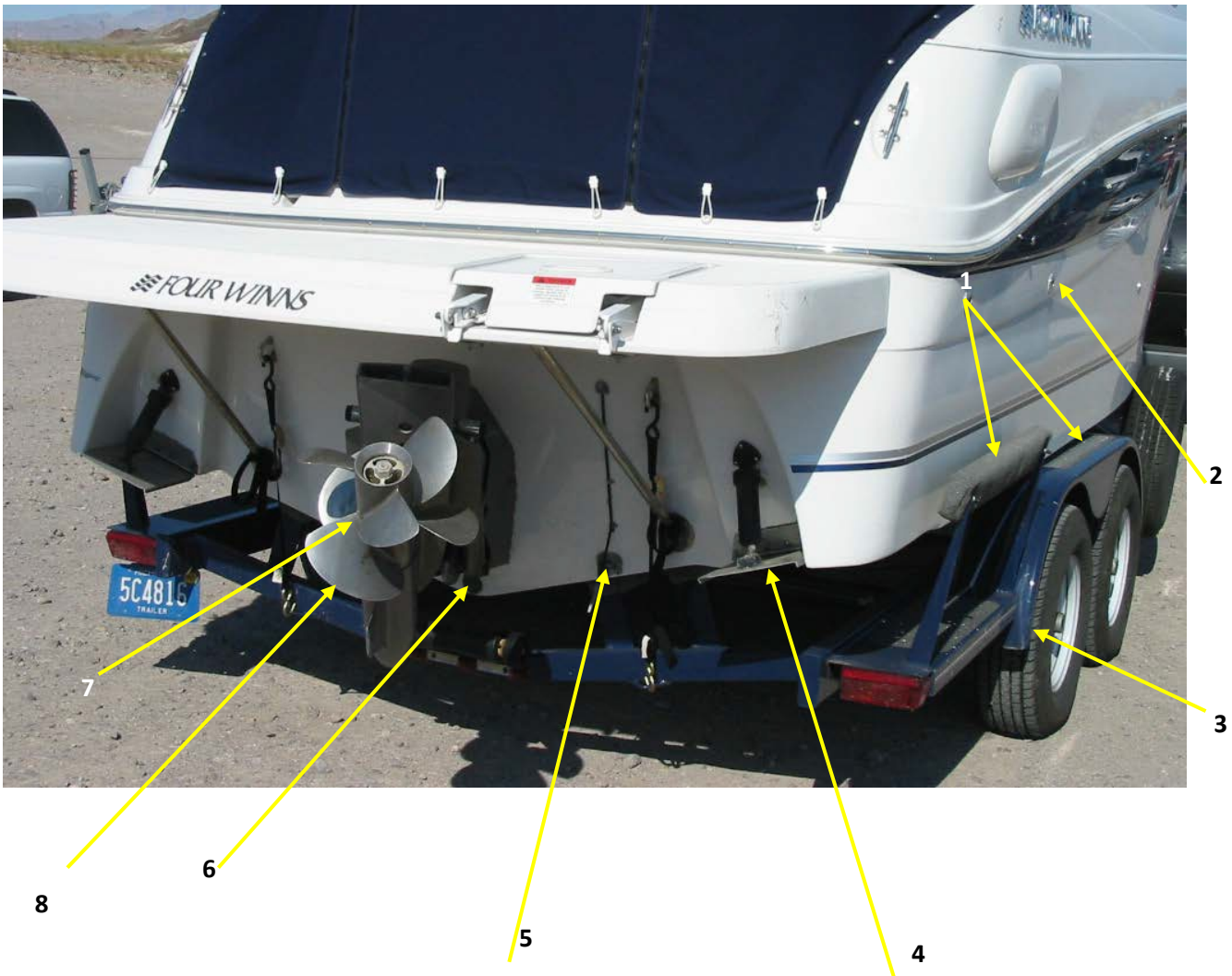
5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_





1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

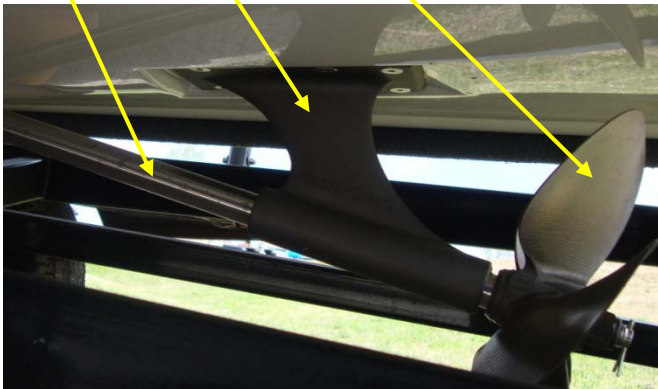
5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. (engine type) \_\_\_\_\_





1. \_\_\_\_\_
2. (engine type) \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

## Watercraft Risk Assessment

### Four Categories of Boats

- ***Non-motorized, Hand-launched***

- These boats are not launched from trailers.
- These boats do not have motors or engines.
- They may, or may not, be required to be inspected pending state or local laws and regulations.



- ***Simple Boats***

- A boat with an open hull AND no containers AND no compartments AND a single outboard motor.
- A hand launched boat that is launched from a trailer or adds a motor.



- ***Complex Boats***

- A boat that has interior compartments OR a closed hull OR more than one motor.



- **Very Complex Boat** – A complex watercraft with more than one internal water devices (e.g. generator, air conditioners, sea strainers, swamp coolers, etc.).



## Watercraft Risk Assessment (cont.)

Some watercraft pose a larger risk of transporting AIS than others. Regardless of the type of boat, try to educate all boaters and recreationists about how they can help stop the spread of AIS!

While invasive mussels were found attached to a canoe intercepted in Oregon in 2013, hand-launched and non-motorized watercraft pose the lowest risk of transporting AIS. The following are examples of common hand-launched and non-motorized watercraft:

1. Canoe
2. Kayak
3. Raft
4. Belly Boat
5. Windsurfer Board
6. Paddle Board
7. Sail Boards
8. Float Tubes
9. Inner Tubes

Note: Marine propulsion systems (gas or electric) should be inspected, regardless of watercraft type.

Note: Any trailer that goes into the water should be inspected.

What are the reasons that non-motorized, hand-launched watercraft are a lower risk for transporting AIS?

1. Hand-launched = no trailer in the water
2. No marine propulsion system
3. Typically do not have interior water holding compartments
4. Typically do not stay on the water long = short exposure time
5. Typically do not stay still on the water = short exposure time
6. Typically do not anchor or make contact with lake or reservoir bottom
7. Typically fully dried out before putting in a car or on top of a car for transport.
8. Provides a low-risk access option for boaters and anglers when inspections aren't present and boat ramps are closed.

## What boats should be inspected?

1. **Very Complex Boat** – A complex watercraft with more than one internal water devices (e.g. generator, air conditioners, sea strainers, swamp coolers, etc.)
2. **Complex boat**—A watercraft that has one or more interior compartments **or** a closed hull **or** more than one motor.
3. **Simple boat**—A boat with a single open hull **and** no containers or compartments **and** a single outboard motor.
4. **Non-motorized boat** – A boat that is not launched from a trailer and has no motor or engine.

### What is the biological risk of moving AIS relate to the complexity of a watercraft?

Generally speaking, the more complex a watercraft is, the higher risk it is for transporting AIS.

Compartments that can hold water inside the watercraft, engines and trailers all greatly increase the risk of AIS being moved into new locations. The table below relates boat complexity to biological risk.

Watercraft Type	Risk Level
Very Complex - House Boats, Cabin Cruisers, Watercraft with Ballast Tanks	Very High Biological Risk
Complex - Large Open Boats, Sailboats, Ski Boats and Wakeboard Boats with no ballast tanks, Personal Watercraft (PWC)	High to Medium Biological Risk
Simple Boats - Open Hull, Single Motors, No Interior Containers or Compartments	Low Biological Risk
Non-motorized - Canoe, Kayak, Windsurfer Board, Sail Board, Belly Boats, Rafts, Float Tubes and Inner Tubes	Very Low Biological Risk

### Boat Anatomy - Where Do We Look?

It is very important that inspectors and decontaminators know the various parts of the watercraft, especially those that can hold standing water, in order to effectively inspect and intercept infested watercraft, in addition to decontaminating the infested watercraft. This knowledge will also help staff communicate with boaters in a professional manner.

Inspections should be done in a standard systematic way each time to ensure nothing is missed.

**H.E.A.D** is an acronym that can help inspectors remember where to look for AIS on boats during entrance and exit inspections. “Use your H.E.A.D. when doing an inspection!”

**H = Hull and Trailer**

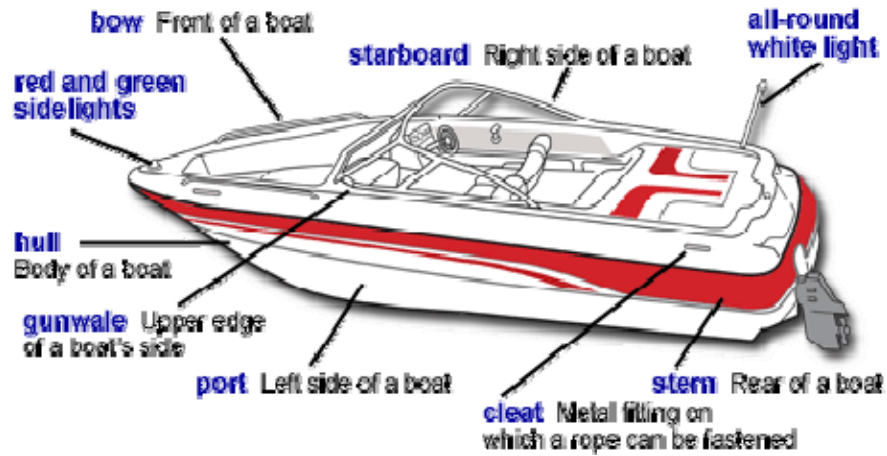
**E = Engine or Motor (including Transom)**

**A = Anchor, Anchor Rope and Equipment**

**D = Drain Interior Compartments**



## THE HULL



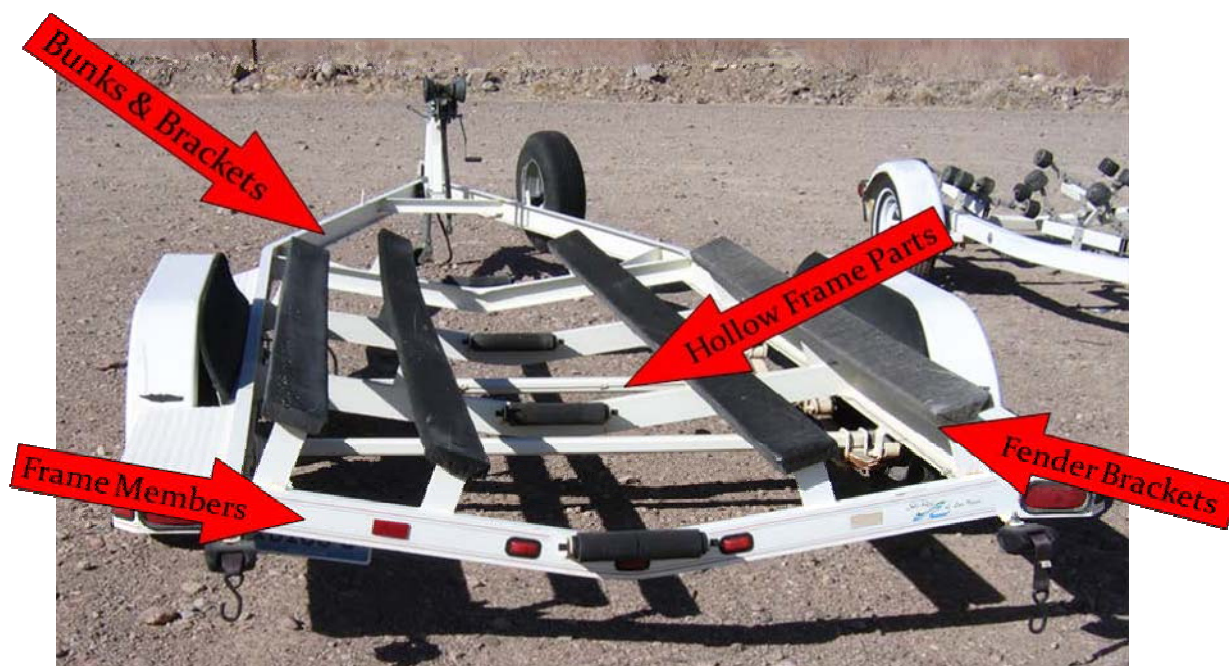
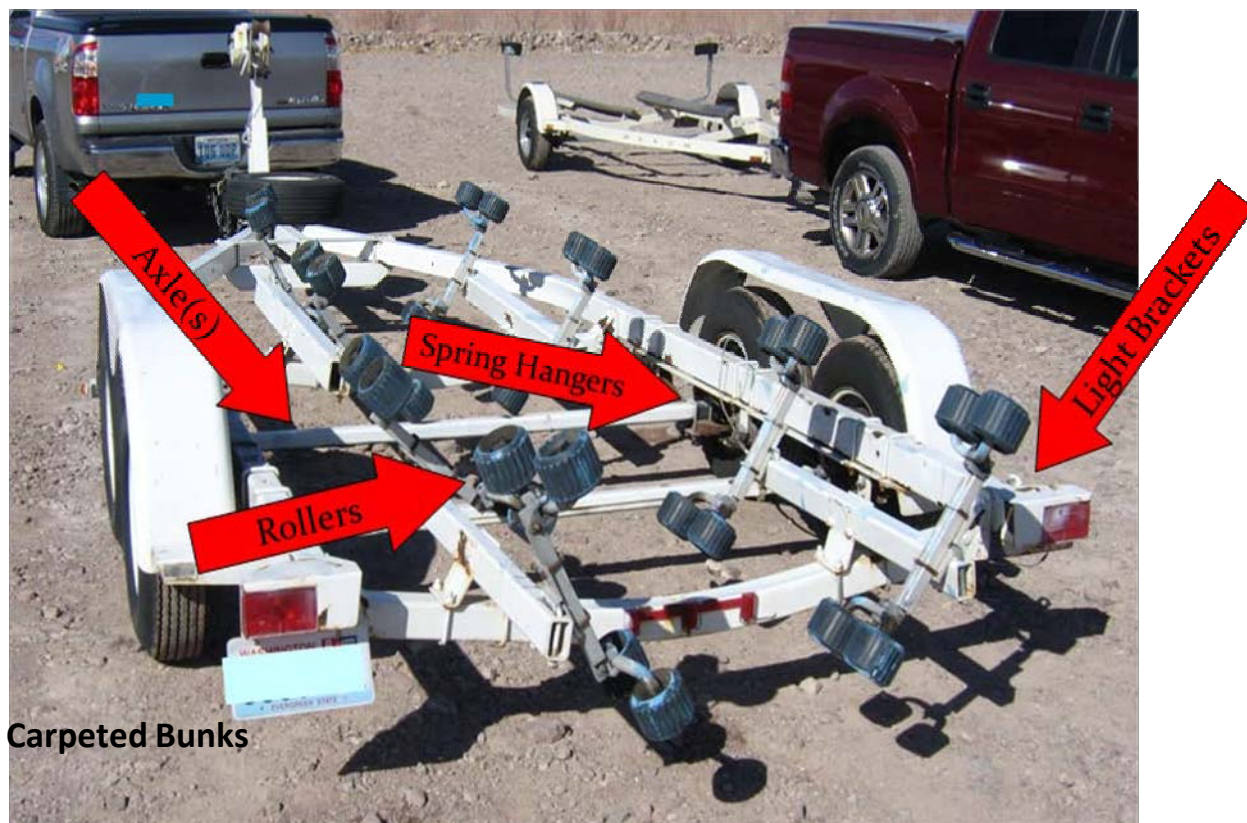
## THROUGH HULL FITTINGS

Use a flashlight!





## TRAILERS – Bunks and Rollers

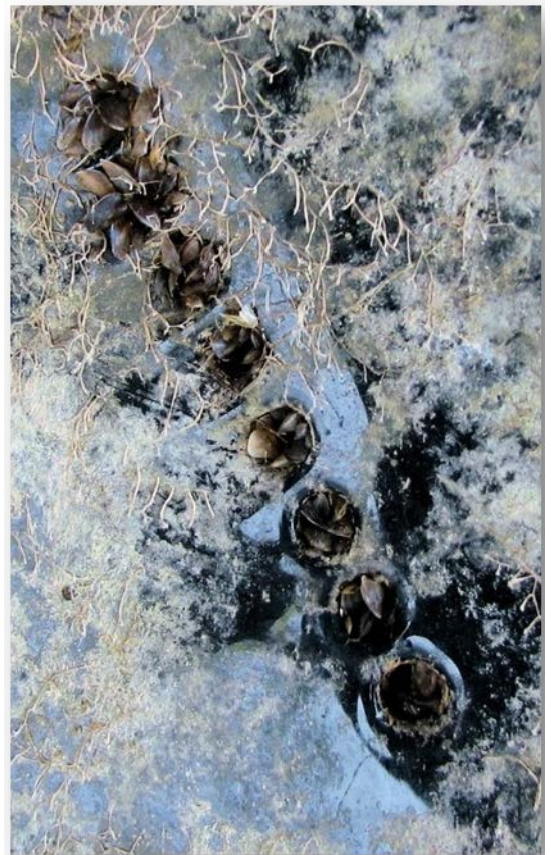
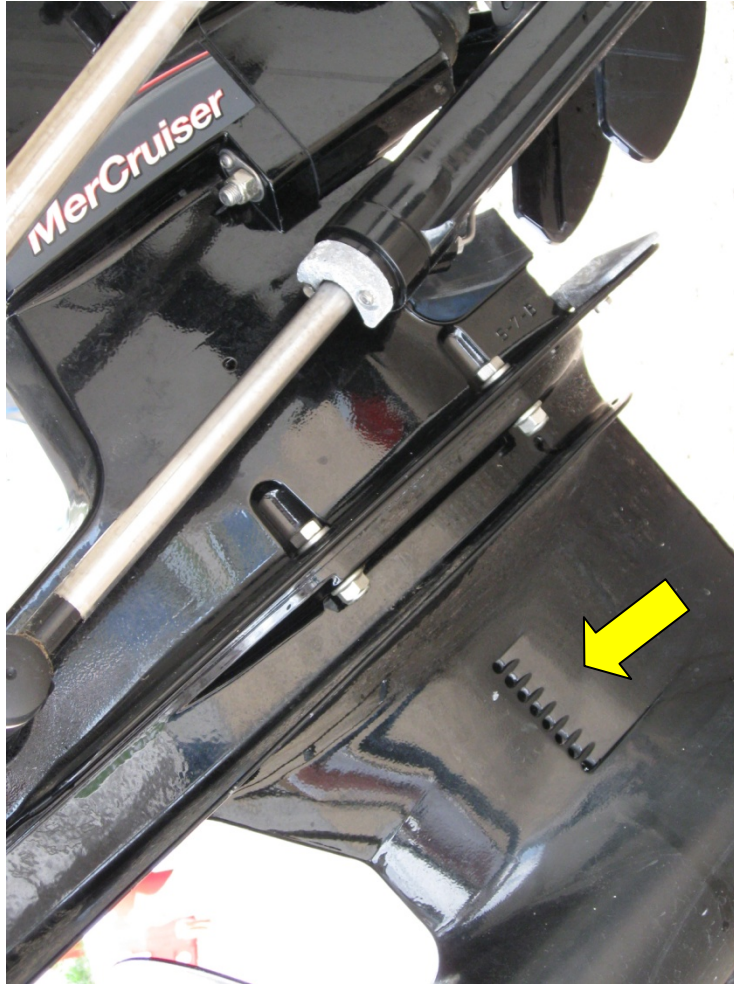


## MARINE PROPULSION SYSTEMS & MOTOR WELLS





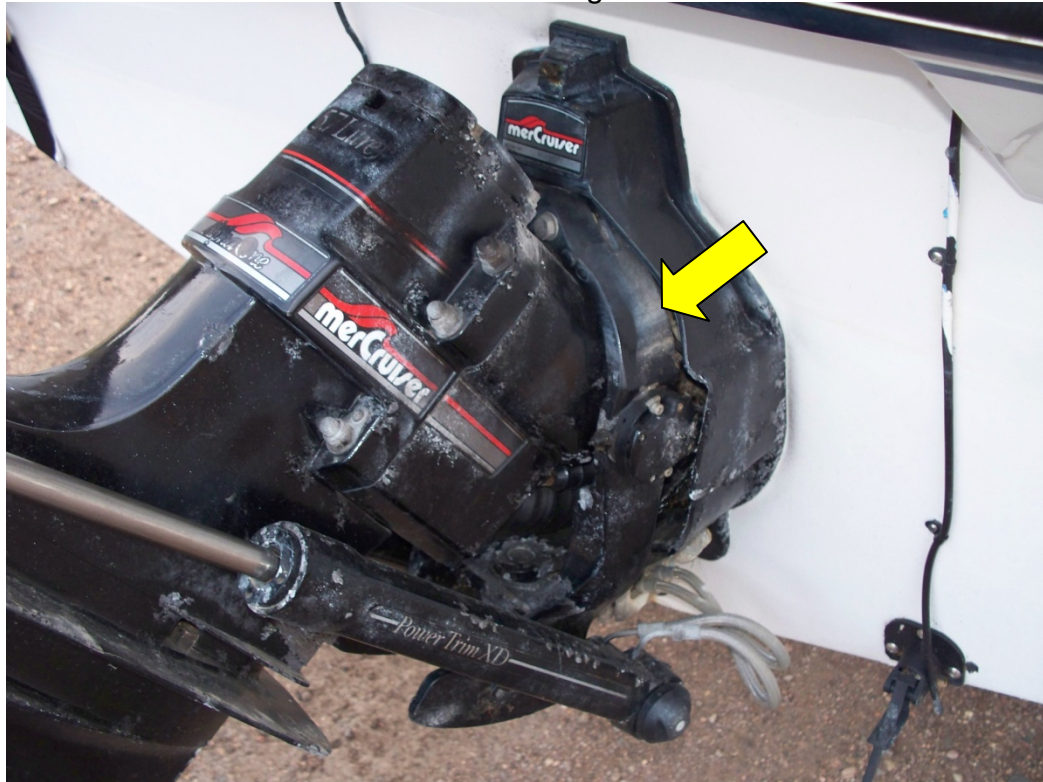
## ENGINE INTAKES





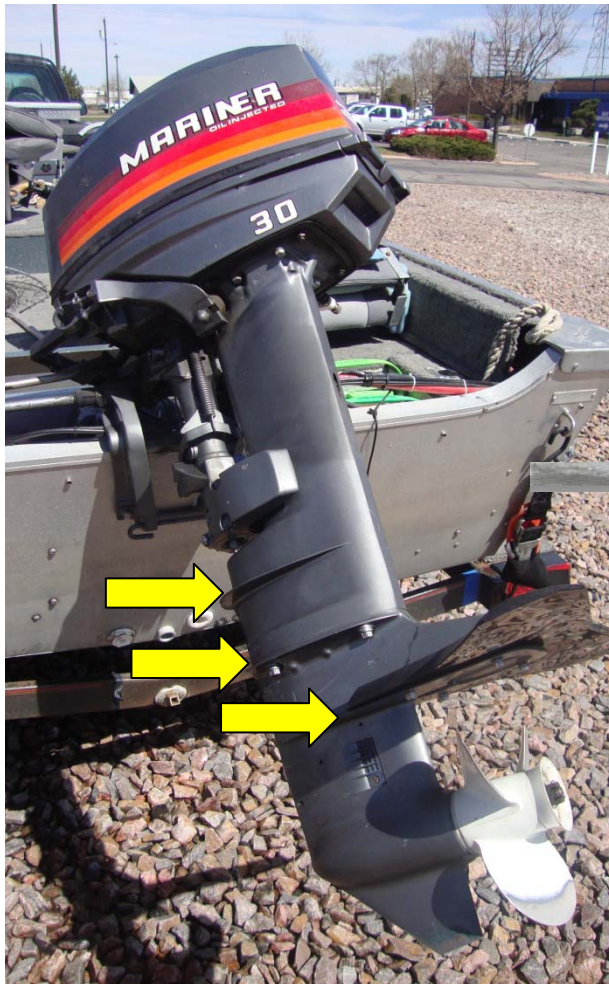
## GIMBAL UNIT OF OUTBOARD OR INBOARD/OUTBOARD ENGINE

Use a flashlight!





## ANTI-CAVITATION PLATES ON ENGINE or MOTOR



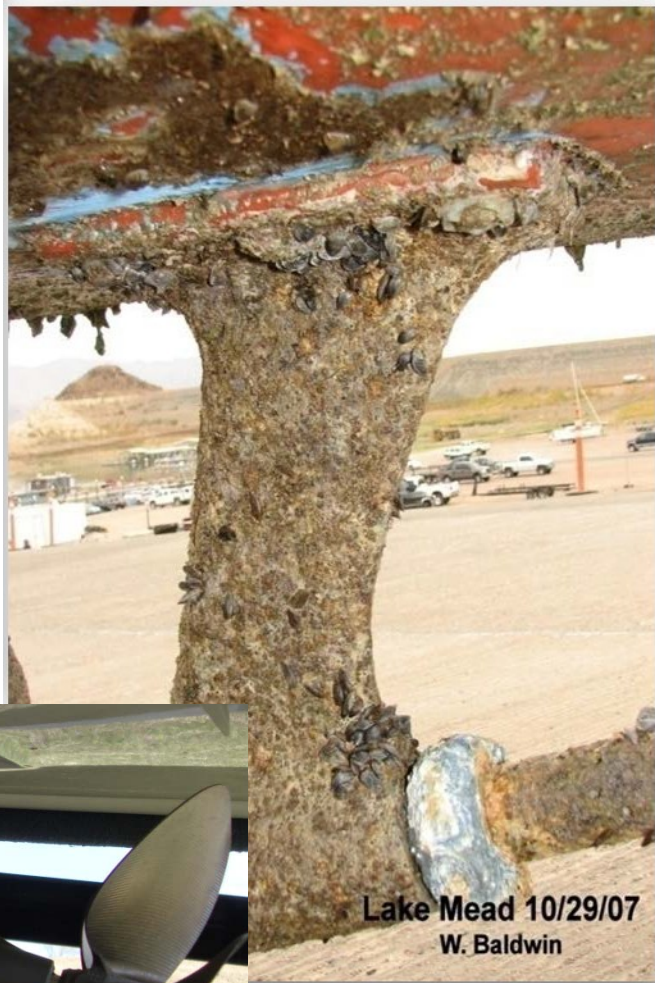


## FASTENERS - NUTS AND BOLTS





## INBOARD ENGINE - PROP,PROP SHAFT and PROP SHAFT SUPPORT

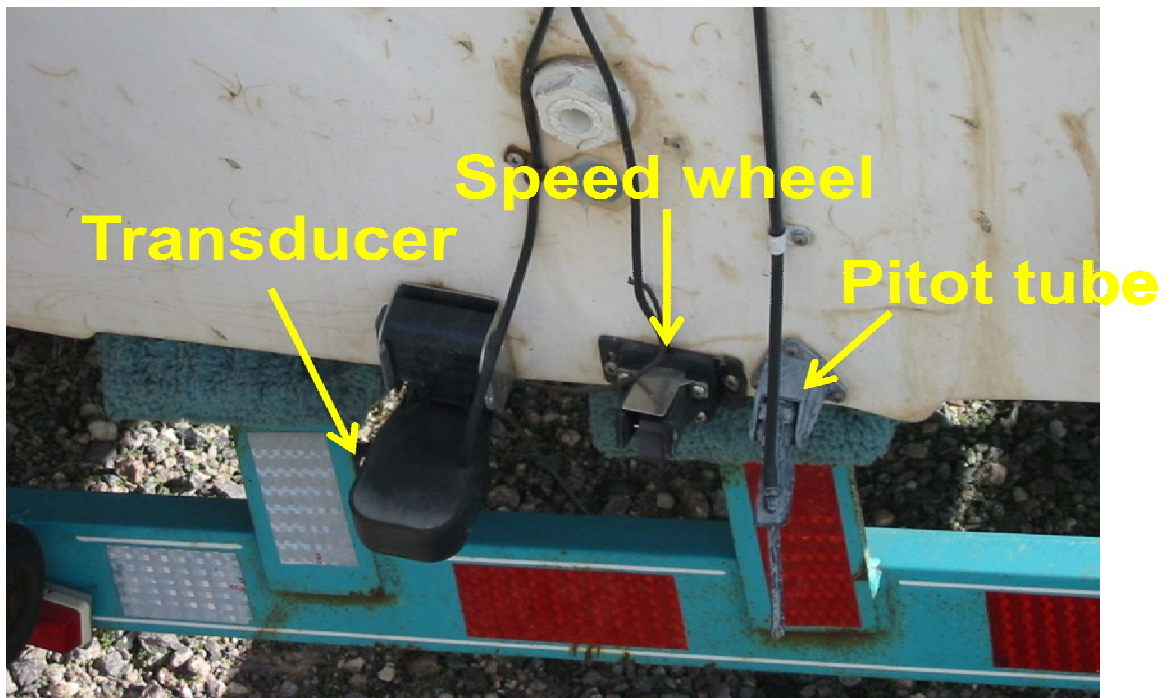




## TRIM TABS ON TRANSOM -TOP AND BOTTOM



## TRANSDUCERS AND PITOT TUBES





## ANCHOR, ANCHOR ROPE/CHAIN AND EQUIPMENT



**BILGE (A lot of boats have more than one bilge access)**





## TANKS



## BLADDERS



## SAILBOATS

- Hull and Trailer
- Centerboard Box
- Motors
- Fittings
- Rudder
- Keel
- Ballast Tanks



## Name That Boat Game

Underneath each photograph:

- A. Circle if the watercraft is hand-launch, simple, complex or very complex
- B. Circle the type of marine propulsion system or human powered
- C. Use the Key Below and Label the Boat Type

Boat Type	Activity Log Code
Administration / Agency Boat	A
Cabin Cruiser	CC
Fishing Boat	F
Hand Launched	HL
House Boat	H
Hunter	HU
Jet Boat	JE
Jon Boat	JO
Other	O
Personal Watercraft	PWC
Pontoon	P
Sail Boat	SB
Simple Boat	S
Ski Boat	SK
Wakeboard Boat	WB



1.A. Hand-Launch Simple Complex Very Complex

1.B. Outboard I/O Inboard Jet

1.C. Boat Type: \_\_\_\_\_



2.A. Hand-Launch Simple  
Complex Very Complex

2.B. Outboard I/O  
Inboard Jet  
Human

2.C. Boat Type: \_\_\_\_\_





3.A. Hand-Launch Simple Complex Very Complex

3.B. Outboard I/O Inboard Jet

3.C. Boat Type: \_\_\_\_\_



4.A. Hand-Launch Simple Complex Very Complex

4.B. Outboard I/O Inboard Jet

4.C. Boat Type: \_\_\_\_\_



5.A. Hand-Launch Simple Complex Very Complex

5.B. Outboard I/O Inboard Jet

5.C. Boat Type: \_\_\_\_\_



6.A. Hand-Launch Simple Complex Very Complex

6.B. Outboard I/O Inboard Jet

6.C. Boat Type: \_\_\_\_\_





7.A. Hand-Launch Simple Complex Very Complex

7.B. Outboard I/O Inboard Jet

7.C. Boat Type: \_\_\_\_\_



8.A. Hand-Launch Simple Complex Very Complex

8.B. Outboard I/O Inboard Jet

Human

8.C. Boat Type: \_\_\_\_\_



9.A. Hand-Launch Simple Complex Very Complex

9.B. Outboard I/O Inboard Jet

9.C. Boat Type: \_\_\_\_\_



10.A. Hand-Launch Simple Complex Very Complex

10.B. Outboard I/O Inboard Jet

10.C. Boat Type: \_\_\_\_\_







11.A. Hand-Launch Simple Complex Very Complex

11.B. Outboard I/O Inboard Jet

11.C. Boat Type: \_\_\_\_\_



12.A. Hand-Launch Simple Complex Very Complex

12.B. Outboard I/O Inboard Jet

12.C. Boat Type: \_\_\_\_\_



13.A. Hand-Launch Simple Complex Very Complex

13.B. Outboard I/O Inboard Jet

13.C. Boat Type: \_\_\_\_\_



14.A. Hand-Launch Simple Complex Very Complex

14.B. Outboard I/O Inboard Jet

14.C. Boat Type: \_\_\_\_\_





15.A. Hand-Launch Simple Complex Very Complex

15.B. Outboard I/O Inboard Jet

15.C. Boat Type: \_\_\_\_\_



## Wakeboard Ballast Tanks and Bags

### Ballast Tanks

A ballast tank is a compartment within a boat, ship or other floating structure that holds water.

Ballast water taken into a tank from one body of water and discharged in another body of water can introduce aquatic invasive species. The taking in and dumping of water from ballast tanks has been responsible for the introduction of species that cause environmental and economic damage. The introduction of zebra mussels in the Great Lakes is an example of this damage.

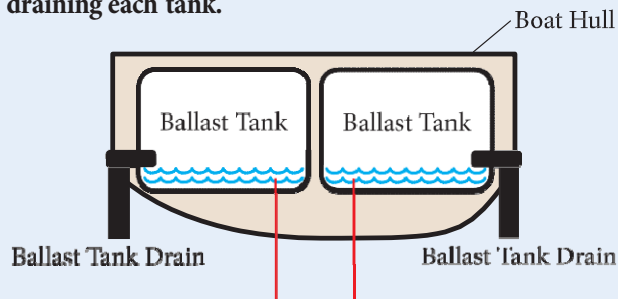
Generally speaking, wakeboard boats are V-drive boats. This means they are an inboard boat with the engine placed backwards in the rear of the boat. This is done to keep more weight in the back of the boat and make the wake larger and steeper. Some wakeboard boat models are direct drive boats where the engine is in the middle of the boat. Most wakeboard boats will have several features that help to create large wakes. These include ballast, wedge, and hull technology.

Most wakeboard boat manufacturers have installed factory ballast but sometimes more weight is needed. Ballast can take the form of hard tanks or soft bags which are filled with water from the body of water the boat is being operated on.

### Ballast Bags

Ballast bags are used to enhance the surf wake made by a wakeboard boat. They are typically filled and drained with a pump connected to a hose. Some ballast bags are designed for integration into an automated ballast system already in place in the wakeboard boat. When filling a ballast bag, it is recommended in most owner manuals to “place the pump in the water keeping it clear of weeds and sand.” When draining, the instructions direct the boater to “place the hose of the pump over the side of the boat.” Because these bags are impossible to fully drain, if a ballast bag has been used in a positive water body, it must be decontaminated prior to it being used on any other water, unless it has been out of the water for 30 days or more. Due to the fact that the ballast bags can be integrated into the ballast system of the boat or are filled and drained with the use of a pump, the water temperature of the decontamination unit must be turned down to 120°F to prevent any damage to the pump or bags.

The diagram shows the cross section of a boat with two water ballast tanks. The placement of the tank drain allows water to remain in the tank after the discharge pump has been activated. Manufacturers have reported that on average, two gallons of water remains after draining each tank.



Standing water left in the ballast tank after draining.

**This water can harbor microscopic live zebra and quagga mussel veligers.**

Many of the ballast bags are placed next to the engine in rear compartments, in place of rear seats, in center floor ski lockers, or under the seats of the open bow boats. During an inspection, it is very important for the inspector to inspect all compartments for any equipment that has come into contact with the water.

### Factory Installed Ballast Bags

All Moomba ballast boats and all but one model of Supra ballast boats have soft ballast bags that have factory installed reversible pumps. They have the same inlet and outlet through-hull drain port located on the bottom of the hull. Almost all of them come with an inboard engine and three ballast bags: two bags are located on the sides of the engine compartment and one in the center floor compartment. All of these bags have a quick connect on the intake and discharge hoses. This way they are easily removed from the compartment to be checked by an inspector. Only one Supra model, the 242, 2011+, has one hard tank located under a ballast bag.

### Other Examples of Ballast Bags

Following are some examples of ballast bags. They can be manufactured in a number of colors and some are uniquely shaped for specific wakeboard boat models.


This custom made w721 wakeboard ballast bag is designed specifically for the arrow shaped center locker of Correct Craft Super Air Nautique wakeboard boats.





es Fat  
d nearly  
andard ballast

The Fly High Pro X Series Fat Seat Sac is designed for inboard boats that have a removable rear seat. The fat seat is huge and it's strong enough to sit on. It has two arms that extend forward on either side of the engine compartment to add even more weight.



**PHOTOS © BAREFOOT INTERNATIONAL & FLY HIGH WAKEBOARDING MFG.**

## This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

## Pontoon

There are numerous manufacturers of pontoon boats. They include but are not limited to: Premier Marine, Manitou, Sun Tracker, South Bay, Starcraft Marine, JC Pontoon, Ponder, Ercoa, Landau, and Lowe.

A pontoon boat typically floats and balances by means of two large, closed cylinders mounted lengthwise.

Some of those cylinders have vents on the top of the pontoons that release condensation that occurs naturally within the cylinder. Typically, pontoons do not have drain plugs or pumps installed to release this trapped condensation water. Other pontoons have welded seals. Some pontoons have partitions, creating two or more separate internal compartments. The insides of pontoon tanks cannot be visually checked for mussels or other Aquatic Invasive Species (AIS).

- Check pontoons for water by knocking on them. If you hear a dull thud, they could be holding water or be filled with “dock foam”. If you hear a hollow empty sound, the pontoon is most likely dry.
- Listen to pontoons. A sloshing sound when stopping the trailer will indicate trapped water in the pontoon. The inspector should then look for damage, holes or water leaking from the pontoon.

Pontoon boats can be simple to very complex; some have active live wells with pumps.

The live well pump is usually located in a cage-like area at the end of one of the pontoons. Some of the live well pumps are intake only; some can also assist in the drainage of the live well.

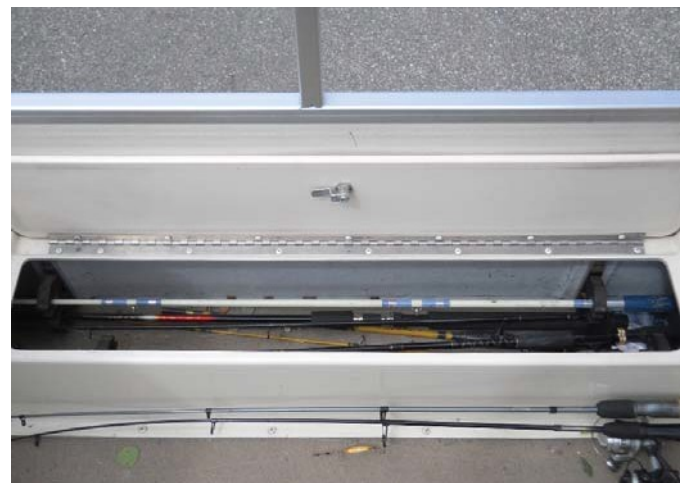
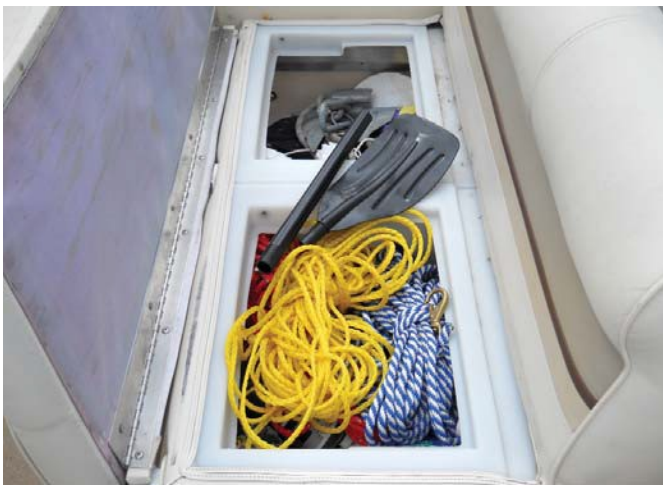


When performing an inspection, the trailers for pontoons are usually quite high off the ground providing the inspector good views of the underside of the pontoon and exposure to the trailer. However, as demonstrated by the photos below, there are lots of areas where AIS attachment is possible. During decontamination, the inspector has to be very meticulous and contact every portion with 140°F water and high pressure. Please note the large areas of carpeted bunks. These should be decontaminated by soaking them with 140°F water at low pressure.





Pontoons typically have lots of seating with removable seat cushions. During a high risk inspection, the inspector should ask the boat operator to open these areas and inspect the equipment, ropes, and all items that may have come into contact with the water.



This photo shows a pontoon that has two pumps located in the cage at the back of the pontoon. One pump is for the live well, the other is for a wash station.



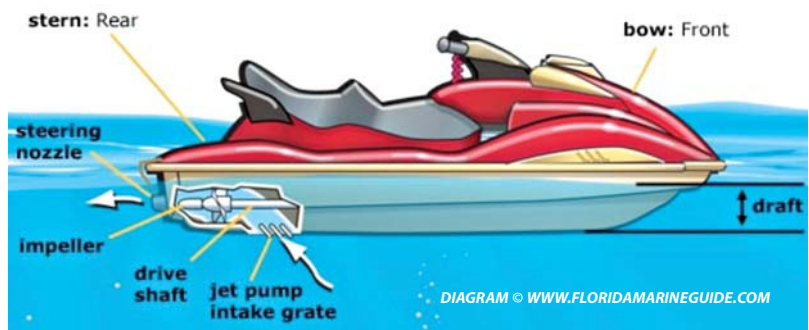
One of the best aspects of a pontoon boat for an inspector is that the outboard motor is typically lowered during transport, which means that it should be fully drained when it is inspected.

## Personal Watercraft (PWC)

A personal watercraft (PWC) is a recreational watercraft that the rider sits or stands on, rather than inside of, as in a boat. Models have an inboard engine driving a pump jet that has a screw-shaped impeller to create thrust for propulsion and steering. They are often referred to by the brand names Jet Ski, WaveRunner, or Sea-Doo.

Most are designed for two or three people, though four-passenger models exist. Stand-up PWCs were first to see mass production and are popular for single riders.

There are a number of manufacturers that build PWCs. They include, but are not limited to, Kawasaki, Honda, Sea-Doo, Yamaha, Suzuki, and DiMora.



When inspecting a PWC have the operator remove the cover in front of the handle bars and the seat over the motor.



Typically, there are two bilge plugs located on the rear of the PWC on either side of the steering nozzle that should be opened during the entrance and exit inspection.



On the bottom of the hull, is an intake grate that should be inspected for mussels, plant, mud, or other suspected AIS attachment.



### How Do I Decontaminate a PWC?

Ask the operator to open the two covers on the PWC. The decontaminator should then start at the bow and perform a standing water decontamination/flush with 120°F water at low pressure in both compartments. Next, back flush the bilge plug openings and the intake grate. Lastly, decontaminate the exterior hull with 140°F water and high pressure, paying special attention to the foot wells. Have the operator run the PWC to blow out excessive water from the decontamination process.

## Chapter 3 Review

1. List four examples of hand-launched watercraft.

---

---

2. List reasons why non-motorized, hand-launched watercraft are lower risk of transporting AIS.

---

---

---

3. A **simple boat** has a(n) \_\_\_\_\_ hull AND \_\_\_\_\_ interior compartments AND a \_\_\_\_\_ outboard.

4. A **complex boat** has \_\_\_\_\_ interior compartments OR a \_\_\_\_\_ hull OR \_\_\_\_\_ engine or motor.

5. Name three types of complex watercraft that inspectors need to pay close attention to:

---

---

6. What makes a watercraft very complex?

---

---

7. Name three types of complex watercraft that inspectors need to pay close attention to:

---

---

8. Why are ballast tanks a big deal for inspection and decontamination?

---



9. Circle the one item inspectors need to inspect on a sailboat that is different from other boats.

- A. Hull and Trailer                      B. Centerboard Box  
C. Rudder                                  D. Motor

10. Match the definition to the engine or motor:

- A – Inboard/Outboard Engine**                      **B – Outboard**                      **C – Trolling Motor**  
**D – Inboard Engine**                                  **E – Jet Engine**

	A marine propulsion system consisting of a self-contained unit that includes a motor, propeller and controls, and is affixed to an angler's boat, either at the bow or stern. Typically electric but also gas powered.
	Enclosed within the hull of the boat. These have a raw water cooling system where water from the reservoir is pumped by the engine to cool it. Attached to the hull of the boat is the propeller shaft and propeller which propels the boat through the water. The rudder acts as the "steering wheel" to guide the boat.
	Located just forward of the transom (stern) and provides power to the drive unit located outside the hull. This drive unit (or lower unit or outdrive) resembles the bottom half of an outboard motor.
	This propulsion system draws the water from under the boat into a pump inside the boat. The water then passes through a series of impellers and stators—known as stages—which increase the velocity of the water flow. The water is then expelled through a nozzle at the stern. The tail section of the unit extends out through the transom of the hull above the waterline. This water stream exits through a small nozzle at high velocity to push the boat forward.
	A marine propulsion system for boats, consisting of a self-contained unit that includes engine, gearbox, and propeller, designed to be affixed to the outside of the transom and is the most common motorized method of propelling small watercraft. As well as providing propulsion, outboards provide steering control, as they are designed to pivot over the gimbal (mounting bracket) and control the direction of the thrust. The skeg also acts as a rudder when the engine is not running.

11. Match the watercraft type with the appropriate risk level.

- A. Low Biological Risk**                      **B. Very Low Biological Risk**  
**C. Very High Biological Risk**                      **D. Medium to High Biological Risk**

	House Boats, Cabin Cruisers, Ski Boats and Wakeboard Boats with Ballast Tanks.
	Large Open Boats, Sailboats, Ski Boats and Wakeboard Boats with no ballast tanks, Personal Watercraft (PWC).
	Simple Boats - Open Hull, Single Motors, No Interior Containers or Compartments.
	Canoe, Kayak, Windsurfer Board, Sail Board, Belly Boats, Rafts, Float Tubes and Inner Tubes.

# Chapter 4 – Inspection Procedures

## \*The Ideal Inspector\*

*What characteristics, traits or qualities make up the Ideal Inspector?*

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_
- 12. \_\_\_\_\_
- 13. \_\_\_\_\_
- 14. \_\_\_\_\_
- 15. \_\_\_\_\_
- 16. \_\_\_\_\_
- 17. \_\_\_\_\_
- 18. \_\_\_\_\_

## Role of the Inspector or Decontaminator

Inspection of watercraft for AIS.  
Decontamination of watercraft for AIS.  
Educate and Inform the public about AIS.

### Inspections. Decontaminations. Education.

The inspector's role is to teach the public to inspect their own boats each time they launch through conducting inspections and decontaminations according to the procedures listed in this chapter.

## The Goal for Every Boat:

Clean, Drain, Dry in between each and every use!

No Mud. No Plants. No Water. No Animals/Mussels.

## What are my priorities as a watercraft inspector?

### 1. Ensure Personal and Public Safety

Your safety and the safety of the public is top priority at all times. Many vehicles and boats will be moving around the inspection area. People will be looking under wheels and through the watercraft. Inspectors will need to make sure all efforts are made to ensure the safety of all involved.

### 2. Educate Boaters

Every contact inspectors make with boaters should educate them about the importance of controlling zebra and quagga mussels and other AIS. Boaters should realize that AIS are spread by their actions (or inaction). They need to understand that they have a lot to lose, in terms of costly repairs to their watercraft, reduced boating access and limited recreational opportunities, if they do not help in this effort. The primary education message is **Clean, Drain, Dry**.

*Clean*—Remove all plants, animals, and mud. Thoroughly clean everything.

*Drain*—Drain every space or item that can hold water.

*Dry*—Make sure the watercraft is completely dry, which means sponging, toweling or pumping all water out.

### 3. Inspecting Watercraft - Assessing the Risk of the Watercraft

What is the risk AIS is hitchhiking on this boat? By following the inspection procedure detailed later in this chapter, inspectors are ensuring that the biological risk of the watercraft is reduced prior to launch.



#### 4. Draining Standing Water

WID procedures are largely based on mitigating the risks associated with organisms that get transported from one water body to another in standing water. These organisms (e.g. mussel veligers, pathogens or plant fragments) are typically microscopic so it is of the highest importance that standing water be drained in between each and every use.

#### 5. Decontamination

If there is a known AIS, or suspect AIS, on a watercraft, or standing water that cannot be drained, sponged, pumped or towed out, it should be decontaminated.

### What Equipment Do I Need?

At a minimum, every inspector should have the following items when performing inspections:

Smartphones, Tablets, or Paper Activity Logs	Magnifiers
Flashlights	Mirrors
Uniforms & Safety Vests	Brochures

### Three Types of Inspections:

These procedures have been proven effective in identification and interception of watercraft that have zebra or quagga mussels, New Zealand mudsnails, rusty crayfish, waterfleas, noxious weeds and other AIS. Following these procedures and educating the boater WILL prevent the spread of AIS.

There are four inspection procedures that will be described in detail later in this Chapter.

1. **Entrance or Off-Water Inspection:** This inspection procedure applies to watercraft before entering prevention or containment water bodies. WID Locations that are not located at a water body such as roadside or highway stations, offices and businesses perform this inspection for customers.
2. **Exit Inspection – Prevention:** This procedure is for boats leaving a prevention lake or reservoir. This inspection ensures that contact has been made with the boater before he/she leaves the boat ramp and verifies that the watercraft is clean and drained prior to leaving. Make sure the boater pulls all plugs and live wells are empty.
3. **Exit Inspection – Containment:** This procedure is for boats leaving lakes or reservoirs that are suspect, positive or infested for AIS. Procedures are focused on high-risk inspections, draining standing water and decontamination.
4. **High Risk Inspection (Entrance or Exit):** This procedure is used on boats found to have a combination of high risk factors including use out of state, prior use in positive or suspect waters, complex boat structure, dirty, or standing water. This is intended to be a very thorough entrance or exit inspection. High-risk inspections are a priority for boats leaving containment reservoirs, and those coming in from detected waters.

## Data Collection – Paper, Web or Mobile Devices

There are currently different systems in use throughout the Western USA for the purpose of collecting data at AIS stations. Most WID programs initially use paper to collect information and assess the risk of watercraft. Paper records are easy to produce and use. They offer a back-up in the event that an electronic system is not viable. Paper works well on-site but later presents problems sharing data, and utilizing data for program analysis and management, responding to customer service complaints, informing enforcement actions, and lost and inaccurate data, among others. Manual data entry from paper to digital form is slow, expensive and error-prone. These problems are relative to scale so large, complex and busy sites have real inspection and decontamination data collection and management challenges. In addition to site challenges, paper systems make it very difficult to communicate across jurisdictions. In order to resolve many of these issues, some WID stations now use electronic data collection methods.

Colorado Parks and Wildlife is currently working through the Western Regional Panel to develop and make a shared mobile application with a web interface available for multi-jurisdictional use in 2016. The new system will be provided to graduates of this course free of charge if they would like to use it. This course utilizes the Colorado form and data collection tools as an example. For more information on the regional data sharing system, please contact [Invasive.Species@state.co.us](mailto:Invasive.Species@state.co.us).

Each WID supervisor or manager will select the best tool for their program.



*A boat inspector interviewing a boater to determine risk factors.*

**State of Colorado**

## WATERCRAFT INSPECTION AND DECONTAMINATION ACTIVITY LOG

Location: \_\_\_\_\_



\* See first line for example.

[illegible]

**Distribution:** White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Yellow—Inspection Location

2/2013- 7,000 13-EB2-12-222/3248FY3



## Keys to the AIS WID Activity Log

### Boat Type Key

Boat Type	Activity Log Code
Administration / Agency Boat	A
Cabin Cruiser	CC
Fishing Boat	F
Hand-Launched	HL
House Boat	H
Hunter	HU
Jon Boat	J
Other	O
Personal Watercraft	PWC
Pontoon	P
Sail Boat	SB
Simple Boat	S
Ski Boat	SK
Wakeboard Boat	WB

### Seal Color Key

Seal Color	Abbreviation
Blue	Bl
Brown	Br
Clear	C
Orange	O
Red	R
Yellow	Y

## Instructions for filling out the AIS Inspection Station Activity Log

Section Header	Column Header	Instruction on How To Complete The Log
N/A	Date	Write the date the inspection is being performed. Inspectors can draw an area down from today's date to the next date so they do not have to repeatedly write the date for each inspection. The key here is to not use a different form for each day. However, busy stations may have multiple forms going at once on the same ramp for people operating different lanes of boater traffic.
N/A	Inspector's ID # or Initials	Write the inspector's ID number or Initials, as assigned.
N/A	Start Time	Record the time the inspection started. Please use 12-hour AM/PM time format, not military time.
Initial Assessment	In or Out	Write "I" for In if the boat is entering OR write "O" for out if the boat is exiting.
Initial Assessment	Boat Type	Use the key provided on the previous page and write down the code for the type of boat (pontoon = p).
Registrations	Boat Registration Number	Write down the boat registration number as seen on the side of the boat. Be sure to include the call letters from the state that the boat was registered to. List all letters and numbers with no spaces or dashes.
Registrations	Trailer License Plate Number	Write down the trailer license plate number as seen on the boat trailer plate. Be sure to include either the state that the trailer is registered to. List all letters and numbers with no spaces or dashes.
Seals	Seal Removed or Applied (Seal Code)	Depending on if the boat was entering or exiting the reservoir, write the <u>full</u> seal code digits (numbers, not letters) of the seal that was either removed or applied.
Seals	Seal Color	Write the first 1-2 letters of the color of the seal (leave blank for green seals). KEY - write "Y" for yellow, write "R" for red, write "C" for clear, "G" for green, "O" for orange, "W" for white, "Bl" for Blue and "Br" for Brown. Again, leave blank if the seal is green or if there is no seal.
Determine Risk Factors	Out of State within 30 days	Ask the boater if the boat has been launched out of state in the last 30 days. If the answer is "yes" then check this box. If any two of the items in this section are checked, perform a high-risk inspection. If only one is checked, perform an entrance inspection
Determine Risk Factors	Infested, Positive or Suspect Waters within 30 days	Ask the boater what waters they have launched this boat in during the last 30 days. If any of the reservoirs or lakes (or states) listed are infested, positive or suspect, then check this box. It is the inspector's responsibility to know which waters are positive or suspect for mussels and other AIS. If any two of the items in this section are checked, perform a high-risk inspection. If only one is checked, perform an entrance inspection.

Determine Risk Factors	Dirty/Crusty/Slimy below waterline	Examine the boat visually and ask yourself this question. If your answer is "yes" then check this box. If any two of the items in this section are checked, perform a high-risk inspection. If only one is checked, perform an entrance inspection
Determine Risk Factors	Complex Boat	Most boats will get a checkmark here. Simple boats are open hull crafts with no containers and a single outboard engine. If the boat is anything other than that - check this box. If any two of the items in this section are checked, perform a high-risk inspection. If only one is checked, perform an entrance inspection
Determine Risk Factors	Standing Water on Vessel	Examine the boat visually and look for standing water. If there is standing water in any amount on the boat then check this box. Do not check this box if the boat has the ability to hold standing water but those compartments are dry. Only check this box if there is actual standing water in the boat. If any two of the items in this section are checked, perform a high-risk inspection. If only one is checked, perform an entrance inspection
Bait	Live Bait	Ask the boater if they have live aquatic bait <u>and</u> visually examine containers for bait. If you find live aquatic bait which is allowed at your site, check this box and follow bait procedure. Record in results section.
Ballast	Ballast Tanks	Ask the boater if they have any ballast tanks and visually inspect for ballast tanks. Leave blank if the boat has no ballast tanks. Write the number of ballast tanks on the boat here. Check to see if the ballast tanks have Mussel Mast'R and follow ballast filter procedure. For ballast tanks with no seal and no filter, send to decontamination after the inspection and follow standing water procedures for watercraft with unverifiable ballast tanks. Record results in results section.
Protocols	Entrance Inspection	Check this box if you are doing a standard incoming inspection (one or no checks in previous section). This is the default inspection for offices and highway/roadside stations inspecting watercraft without high risk factors. NOTE - If one or no boxes in the previous section, Determining Risk Factors are checked, perform a standard inspection. If two or more boxes are checked, perform a high-risk inspection.
Protocols	High Risk Inspection (Entrance or Exit)	Check this box if a high-risk inspection is being performed. Only one box in this section should be checked (entrance or high risk). NOTE - If any two boxes in the previous section, Determining Risk Factors are checked, perform a high-risk inspection!
Protocols	Exit Inspection	Check this box for boats exiting ("O" in the "In or Out" Column) when completing a Clean, Drain, Dry exit inspection (same as incoming/entrance inspection with no risk assessment questions).
Procedures	Hull, Trailer, Exterior Felt and Checked.	Inspectors should do this every time you inspect a boat and check the box when completed.

Procedures	Engine or Motor, Transom Checked w/flashlight and Drained.	Inspectors should do this every time you inspect a boat and check the box when completed.
Procedures	Anchor and Equipment Checked	Inspectors should do this every time you inspect a boat and check the box when completed.
Procedures	Drain and Check Interior Compartments	Inspectors should do this every time you inspect a boat and check the box when completed.
Results	Standing Water Decontamination	Check this box only if a standing water decontamination is being performed
Results	Full Decontamination	Check this box if a full decontamination for suspect or known AIS is performed. First, inspectors should call their supervisor upon interception. If it is a known mussel boat, notify the State AIS Program. If a full decontamination is performed, fill out a high-risk form before, the 4 page decon form, take photos, take samples and a high-risk form after decon. Please follow the strict procedure and detailed instructions in the Decontamination chapter.
Results	Plant Decontamination	Check this box if a hot water decontamination to kill aquatic plants is performed to remove those that couldn't be removed by hand as part of the regular inspection process. No plants should be allowed to be transported on watercraft.
Results	Bait Decontamination	Check this box only if a bait decontamination is being performed.



## SEALS and RECEIPTS:

The seal and receipt program is critical for cross jurisdictional communication, efficient use of fiscal and human resources, and providing optimal customer service to boaters; all of which will ultimately provides for the best resource protection. The first step in the entrance inspection procedure is to check for a seal and verify the receipt. The last step in the exit inspection procedure for both prevention and containment reservoirs is to apply a seal and receipt. Therefore, it is critically important that inspectors understand the seal system before learning the full inspection procedures.



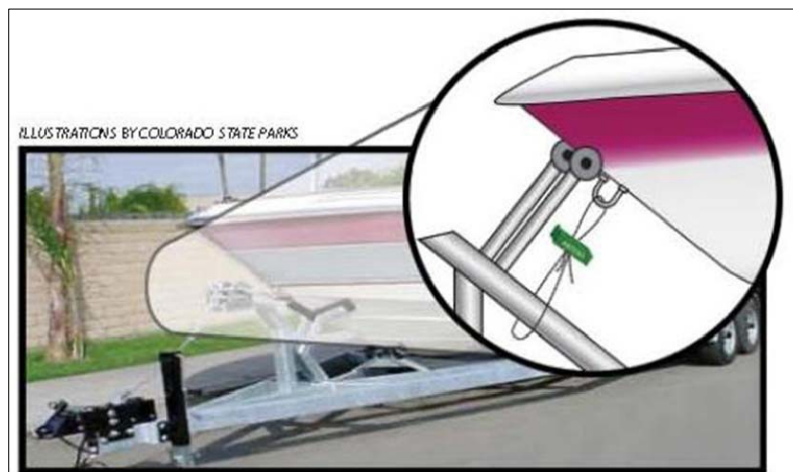
### What is the seal and receipt system?

WID stations use a wire seal, coupled with a receipt, to communicate the location of the boat's last inspection or decontamination and associated information to the next inspector. The seals vary in color by jurisdiction, but the color is essentially irrelevant. The seal locks the watercraft to the trailer indicating to the last inspector it has not launched since the seal was issued. The receipt accompanies the seal and provides documentation regarding date of last inspection, procedure used, type of decontamination, if any and other important information.

When applied properly, seals with receipts greatly decrease the amount of time for boaters and inspectors. In most cases, the watercraft will not need to be inspected or decontaminated if it has a valid seal and receipt. This is especially useful when boats are traveling through many states with roadside stations, or boating between negative waters. The seal and receipt system is critically important when boats are coming from containment locations and moving into negative waters to provide an alert that the watercraft poses a higher risk of transporting AIS.

In most states with WID programs, boats will get a seal and receipt if they leave a prevention or containment reservoir, office, business or roadside station, and pass an inspection or decontamination of any kind. The receipt will indicate what procedures were performed, when, where and by whom. It is imperative that inspectors understand exactly how these seals are used and what they tell them about the risk level of that watercraft.

NOTE: It is critical to attach the seal in a way that it will be broken if the watercraft is separated from the trailer. Typically, the wire seal goes between the eyebolt and hard, welded part of the trailer. Be advised that some winches can be unrolled completely and separated from the seal without breaking.



## SEAL RECEIPTS

In most cases, seals are only valid with a matching receipt. The seal tells you that the watercraft has not launched since its last inspection. The receipt is very important because it tells the next inspector what kind of inspection and/or decontamination was performed at the last site, in addition to when it was performed and by whom. This information will indicate what level of inspection or decontamination, if any, is necessary for to perform prior to launch. There are different colored receipts being used for prevention (white) and containment (blue) waters in some states to provide a visual cue that the watercraft is coming from a low risk water (prevention) or high risk water (containment). Examples of receipts from Colorado are on the right.

### PREVENTION WATERS WHITE SEAL RECEIPT:

Documented boats with seals and white receipts from prevention waters are the lowest risk watercraft because they have proof of compliance and are coming from a negative location.

### CONTAINMENT RESERVOIR RECEIPT:

Watercraft with seals from suspect, positive or infested waters should be given a different colored receipt. Colorado uses a blue receipt. This provides a visual indication that the watercraft is coming from a high risk contaminated water body. Inspectors must read the receipt in order to determine if this watercraft is able to launch, or needs decontamination. If the watercraft was decontaminated upon exit, it poses a lower risk than if it was not decontaminated. Similarly, if the watercraft has been out of the water for more than 30 days it poses a lower risk of transporting AIS than if it has been in an infested water within the last week. This is important information to know when assessing the risk the watercraft poses of introducing AIS and determining if a decontamination on this watercraft is needed.

State of Colorado	
INSPECTION AND DECONTAMINATION SEAL RECEIPT	
For use when applying green seals to boats at PREVENTION waters. Provide original to watercraft owner (white) and keep carbon copy (yellow).	
WID Location: _____	
Date/Time: _____	
Inspector's ID #: _____	
Vessel Registration (CL #): _____	
Trailer Plate #: _____ Seal Serial #: _____	
<b>PROCEDURES PERFORMED (Every line must be checked to be valid)</b>	
Exit (HEAD) Inspection:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Exit High Risk Inspection:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Full Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Standing Water Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Plant Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Bait Treatment or Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
<b>HOW TO TREAT A BOAT WITH A GREEN SEAL</b>	
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:	
1.) Boat is returning to the same location; or	NOTES: _____
2.) Boat has been out of the water for more than 30 days; or	_____
3.) Boat has been decontaminated; or	_____
4.) Boat is clean and fully drained.	_____
If not, perform an inspection prior to launch.	
FILE COPY	
Distribution: White—Owner/Operator Yellow—Inspection Location	
1 - 6/2013 - 140,000 13-EB2-12-4/3250FY3	

State of Colorado	
INSPECTION AND DECONTAMINATION SEAL RECEIPT	
For use when applying green seals to boats at CONTAINMENT waters. Provide original to watercraft owner (blue) and keep carbon copy (yellow).	
<i>This receipt only valid for State Parks preinspection if watercraft was decontaminated.</i>	
WID Location: _____	
Date/Time: _____	
Inspector's ID #: _____	
Vessel Registration (CL #): _____	
Trailer Plate #: _____ Seal Serial #: _____	
<b>RETURNING BOAT</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>PROCEDURES PERFORMED (Every line must be checked to be valid)</b>	
Exit (HEAD) Inspection:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Exit High Risk Inspection:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Full Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Standing Water Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Plant Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Bait Treatment or Decontamination:	<input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
<b>HOW TO TREAT A BOAT WITH A GREEN SEAL FROM A CONTAINMENT WATER</b>	
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:	
1.) Boat is returning to the same location; or	NOTES: _____
2.) Boat has been out of the water for more than 30 days; or	_____
3.) Boat has been decontaminated.	_____
If not, perform an inspection to check for standing water.	
• If there is no standing water and the boat is clean and dried, allow launch.	
• If any standing water is found, a standing water decontamination is required before allowing launch.	
<b>CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!</b>	
Distribution: Blue—Owner/Operator Yellow—Inspection Location	
2 - 6/2013 - 65,000 13-EB2-12-4/3250FY3	

## What is the Recommended Procedure for Removing a Seal?

The watercraft poses very little to no risk of introducing an AIS if it is returning to the same location, been out of the water for more than 30 days, or was previously decontaminated for standing water, plants or bait. Therefore, if one of the following scenarios is true, the recommended procedure is to verify the receipt, thank the boater and allow launch.

- Watercraft is returning to the same lake/reservoir
- Watercraft has been out of the water more than 30 days
- Watercraft was decontaminated (and was not a mussel encrusted boat)

The overall goal is to prevent the movement of attached zebra or quagga mussels, or other AIS being transported in water or mud, on watercraft. Therefore, if the watercraft is moving between prevention waters, and has not been out of the water for more than 30 days or been decontaminated, check for standing water by having the boater pull the bilge plug and lower the motor. If the watercraft is holding standing water, re-inspect. If the watercraft is dry, allow launch without re-inspection. The receipt tells the next inspector the boat is coming from a site with no AIS and the seal tells the inspector it hasn't launched since. Watercraft with ballast tanks cannot be fully drained so follow ballast protocol in the inspection procedure later in this chapter.

Watercraft from containment locations are the highest risk. Seals and receipts are invaluable to notify the next inspector that the watercraft last boated in a positive or infested location. If the documented watercraft is from a containment location, the inspector should follow check to see if the boat has been out of the water for more than 30 days, or if it was decontaminated with hot water upon exit. Those two factors lower the risk of the watercraft transporting viable AIS.

- If the watercraft was decontaminated for adult mussel attachment, perform a high risk inspection and if any mussels are found, perform a full decontamination.
- If the watercraft was decontaminated for standing water, or has been out of the water for more than 30 days, thank the boater and allow launch.
- If the watercraft has not been decontaminated, and has not been out of the water for more than 30 days, perform a high risk inspection. If mussels, standing water or other AIS are found, perform a full decontamination.

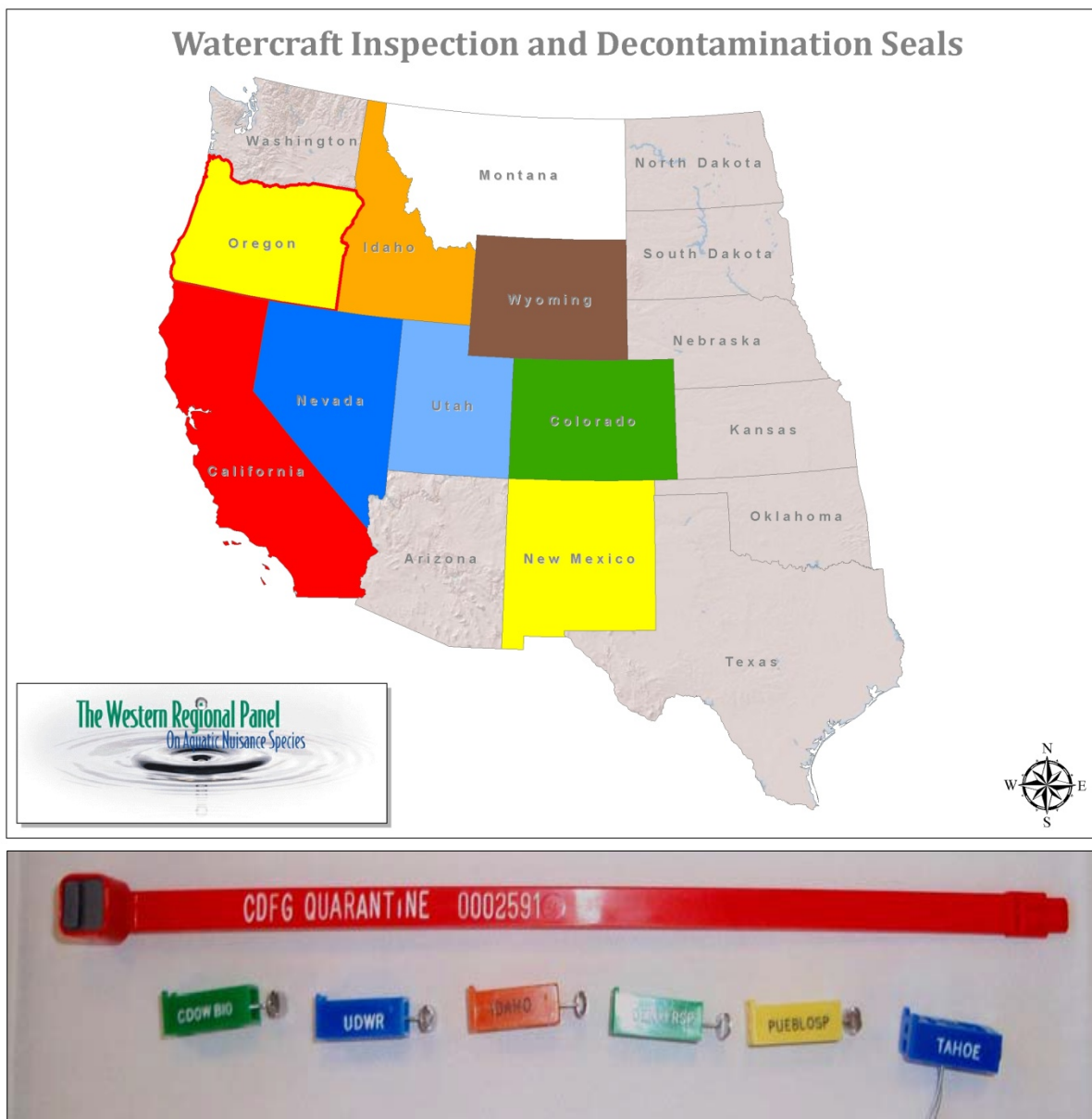


*Can you tell what is wrong with the seal application pictured to the left?*

### Seals Explained to the Public:

- Seals are not a free pass into the lake or reservoir.
- A seal and receipt combined is proof of compliance.
- It could speed up entry to the next water.
- The boater must stop at the inspection station and have the seal and receipt verified.
- The watercraft should be allowed to launch if it is returning to the same location, been out of the water for more than 30 days or the watercraft is clean, drained, and dry.
- If it is not returning to the same location or has not been out of the water for more than 30 days, it may get a quick check prior to launching.
- If the watercraft is not clean and dry, it will most likely get re-inspected.
- Keep watercraft clean and dry and get on the water fast!

### What Color Seals Do State Agencies Currently Use?





## What Do the Various Seal Colors Being Used by State Agencies in the West Mean?

Entity	Seal Color	Description
California	Red	Red seals are for quarantined boats from border inspection stations. Paperwork/Receipt Given. <i>Note: Various local governments in CA have their own seals that are being used for a variety of purposes. To learn about a specific seal, visit <a href="https://www.wildlife.ca.gov/Conservation/Invasives/Quagga-Mussels">https://www.wildlife.ca.gov/Conservation/Invasives/Quagga-Mussels</a> and click on the last link under the Information Resources heading.</i>
Colorado	Green	Statewide Seal - Boat Passed a Successful Inspection and/or Decontamination. Receipt Given. <i>Note: The City of Aurora uses blue seals with no receipts, and the City of Westminster uses clear seals with no receipts for returning permit holders.</i>
Idaho	Orange	Boat Passed a Successful Inspection and/or Decontamination. ID will only issue a receipt if the boater indicates that they are going out of state. In-state boats are recorded electronically without giving the boater a paper receipt (ID uses a boater passport).
Lake Tahoe	Blue	Boat Was Last in Tahoe OR Passed a Successful Inspection and/or Decontamination. No Receipt Given.
Montana	White	Boat Passed a Successful Inspection and/or Decontamination. Receipt given.
New Mexico	Yellow	Boat passed Successful Inspection or Decontamination. Receipt Given.
Oregon	Red	Boat Passed a Successful Full Decontamination at Roadside Station. Boat is required to submit to quarantine after decontamination and red tagged boats have not yet completed the quarantine. Receipt Given.
Oregon	Yellow	Boat Passed a Successful Inspection at Roadside Station. Receipt Given.
Utah	Blue	Boat Passed a Successful Full Decontamination. Receipt Given. Seals are not given for inspection alone.
Washington	N/A: No Seal	Receipt is given following inspection and/or decontamination.
Wyoming	Brown	Boat Passed a Successful Inspection and/or Decontamination. Receipt Given.

## Step-By-Step Procedures for Inspections:

### Inspection Step-By-Step Procedure – Prevention & Containment Entrance or Off-Water Inspection

This is the complete inspection that is performed at WID stations on watercraft entering the lake or reservoir regardless of status (infested, positive or negative), in addition to WID stations that are not located on a lake or reservoir (e.g. offices, roadsides). This procedure includes a screening interview, visual and tactile inspection of all portions of the watercraft that could come into contact with water.

#### Step 1 - Greet and Educate the Boater

- Introduce yourself
- Provide the boater with a brochure or educational item
- Provide a brief verbal explanation of the purpose of inspection
- Provide an explanation of what you are looking for (e.g. mussels or water or bumps on boats)
- Mention the words Clean, Drain, Dry

#### Step 2 – Ensure personal and public safety

- Inspectors should ask the driver to turn off the engine, put on the parking brake and step out of the vehicle.

NOTE: Consider putting chocks under the wheels of the vehicle and the trailer. The inspector will have to get under the trailer and climb on the watercraft, so it is important to prevent boats or the trailer from rolling.

#### Step 3 - Initial Assessment

- Record on the Activity Log or in the Mobile Application (Data Collector) the following information
  - In or Out
  - Boat Type
  - Boat Registration Number
  - Boat Trailer License Plate
- Check for Seal and Receipt
  - If present, record data on Activity Log or Data Collectors and follow seal procedure.

#### Step 4 – Determining Risk Factors

This is like airport security – you are screening for rare events. Inspectors will need to look at a lot of boats quickly and determine if there is a high risk. While there are a total of five high risk factors, there are two very important questions that must be asked first:

1. Has the boat launched out of state in the last 30 days?
  - a. If yes, where?
2. Where has the boat launched in the last 30 days?
  - a. Listen carefully and pay attention to notice if any of the locations listed are positive, suspect or infested.

NOTE: Inspectors should ask both of the above questions to adequately determine watercraft risk. There are reservoirs in other states that are named the same (e.g. Sylvan Lake State Park in South Dakota and in Colorado). If the inspector asks only one of the above questions, or combines these two questions into one “Where has the boat launched in the last 30 days?”, it is likely the inspector will not get complete information to assess risk, which could result in a mussel boat being allowed to launch and infest your water!

3. Visually check the watercraft’s exterior to determine if it is “dirty, crusty or slimy”
4. Identify if the watercraft is a complex vessel (defined as a watercraft that has one or more compartments, or a closed hull, or more than one motor or engine)
5. Visually and physically inspect the watercraft to determine if there is any standing water present. (This step may be performed later in the procedure when the inspector is checking interior compartments for standing water.)

**IMPORTANT: If 2 or more of the above 5 risk factors are true (checkboxes on the log or data collector), and then the watercraft should get a high risk inspection.** If only 1 of the above is true, then the watercraft gets the Entrance Inspection.

#### Step 5 – Ask About Live Aquatic Bait

- Ask boaters if they have live aquatic bait.
  - a. If yes, follow bait procedure in decontamination chapter.
  - b. If no, continue with inspection.

#### Step 6 – Check for Ballast Tanks

1. If the watercraft has a seal and valid receipt, and the tanks were decontaminated → thank the boater and allow launch.
2. If the watercraft has a seal and valid receipt, and was not decontaminated, and is from a negative prevention reservoir, have the boater run the ballast pumps and get as much water out as possible → thank the boater and allow launch.
3. If the watercraft has a seal and valid receipt from less than 30 days ago and was not decontaminated, and is from a containment reservoir → complete a high-risk inspection and perform a standing water decontamination on ballast tanks. (same is true for I/O engines from containment waters)
4. If the watercraft has no seal and receipt, check to see if the ballast tanks have a Mussel Mast’R filter installed. Boats may have a windshield sticker that alerts you there is a Mussel Mast’R installed.
  - i. If yes, check the filter’s sticker and verify the date is less than six months old.
  - ii. Next, check the filter’s seals and verify they are intact.
  - iii. If is less than six months old and the filter’s seals are intact, the boat can be allowed to launch without a standing water decontamination of the ballast tanks (pending there is no AIS detected on the watercraft).



- iv. If the Mussel Mast'R date is more than six months old, OR the tamper proof seals are not intact, perform a standing water decontamination prior to launch.
5. If the watercraft has no seal and receipt, and no Mussel Mast'R filter, complete the inspection and then, at a minimum, perform a standing water decontamination on the ballast tanks prior to allowing launch.

Step 7 – Perform the visual and tactile entrance inspection of the watercraft, using the acronym H.E.A.D. to ensure that the watercraft is properly inspected.

### **Hull and Trailer – Rapid Exterior Inspection**

1. Look over (visual) and feel (tactile) the entire watercraft on both sides of hull and trailer.
2. Physically inspect the through hull fittings.
3. Check trailer bunks or rollers, tire wells, lights and electrical.
4. Remove any plants or plant fragments that are present.
5. Ask the boater to remove the bilge plug when inspecting the transom.
6. Physically and visually inspect the bilge area and use a flashlight to visually see if any AIS are present.
7. If applicable, have the boater activate the bilge pump.
8. If the watercraft has an inboard engine, be certain to carefully inspect the prop, prop shaft and rudder.

NOTE: It is important to explain what you are looking for and educate boaters so that they can inspect their own boats. It is also important to start and end inspection at the same place on the watercraft. Look the boat over and feel the hull with the boater. The young mussels may feel like bumps or sandpaper on the craft. Trailers can pose as high a risk as boats, so carefully check trailer rails, lights and electrical wires, as well as the license plate and trailer pads. This is a good opportunity to use your inspection mirrors and flashlights to look at difficult nooks and crannies on the underside of the boat.

### **Engine or Motor**

1. Visually and physically inspect the engine with a flashlight when it is in the trailer mode (up).
2. Ask for the outboard or I/O to be lowered
2. Visually and physically inspect the gimbal area of the outboard or I/O with a flashlight.
4. Visually and physically inspect the transom or rear of the boat and any attached instruments.

### **Anchor and Equipment Checked**

1. Ask to see the anchor and anchor rope or chain.
2. Visually and physically inspect the anchor and rope or chain for mud, plants and/or AIS.
3. Check any additional equipment such as life vests, buoys, paddles, ropes, nets, etc.
4. Ensure all equipment is clean and dry.

### **Drain and Check Interior Compartments**

For larger craft, you will need to get into the watercraft to inspect interior compartments that could hold standing water (e.g. live wells). For smaller craft, you may be able to see without entering the watercraft. Ensure that the watercraft is drained to the best of your ability.

1. Ask for permission to board the watercraft and ask the boater to climb in first. Follow the boater into the watercraft the same way they entered. Be careful to prevent either the boater or inspection staff from falling or getting hurt. Always maintain three points of contact with the watercraft and never jump off. If the boater takes off their shoes to board, you should also take off your shoes



before boarding.

2. Ask the boater to open up compartments so you can see all bait wells, live wells, equipment lockers and verifiable ballast tanks.
  - a. If the watercraft has standing water in the bait well or in any container, the inspector should work with the boater to remove standing water from the watercraft using a pump, sponge, or towel. If the watercraft can't be drained, it should be decontaminated.
3. If the watercraft has an inboard or I/O engine, inspect the engine compartment and its bilge. These engines do not drain fully and may require a standing water decontamination prior to launching.

#### Step 8 - Closeout

1. Remind the boater to replace bilge plug. The boater is responsible to ensure the watercraft is watertight before launching.
2. Ask the boater to raise the lower unit of the engine to avoid damages during transport.
3. Seal and Receipt
  - a. If working at a prevention lake or reservoir, remind the boater to get an exit inspection with a seal and receipt upon exit to make the inspection process much quicker next time around.
  - b. If working at an off water location, apply a seal and give the boater a receipt.
4. Ensure all inspectors are finished looking at the watercraft and that nothing was found.
5. Yell "stand clear" to ensure the safety of staff and the public.
6. Thank boater for keeping their boat Clean, Drain, and Dry.
7. Complete the WID Activity Log or submit the mobile application record.

#### High Risk Inspection Procedure – Prevention & Containment

High risk watercraft are those without seals and receipts (undocumented boats) which have two or more risk factors checked on the activity log or mobile application. High risk inspections are also performed on watercraft coming from infested waters in the last 30 days, with a seal and receipt that was not previously decontaminated; and mussel boat notifications from infested waters.

1. Entrance at Prevention and Containment Stations, Roadsides, Offices and Businesses - 2 or more checkmarks in the *Determining Risk Factors* section for incoming watercraft.
2. Exiting at Containment Waters – all exiting watercraft

As detailed above in Step 4 of the Entrance Inspection Protocol High Risk factors include:

1. The boat has launched out-of-state in the last 30 days.
2. The boat has launched in positive, suspect or infested waters in the last 30 days.
3. The boat is dirty/crusty/slimy.
4. The boat is complex.
5. The boat has standing water present.

*In a High Risk Inspection, the inspector performs H.E.A.D. as detailed in Step 7 of the Entrance and Exit Inspection procedure, only they spend a lot more time and pay much closer attention to detail.*

A high-risk inspection should include a thorough and complete visual and tactile inspection of all portions of the watercraft, trailer, and any of the equipment or gear, ropes, or anchors. The time it will take to complete a High Risk Inspection may vary greatly depending on the type and complexity of the watercraft.

- Feel the entire hull, trailer and transom below the water line focusing on right angles and fasteners.
- Be extremely thorough with engine/motor and gimbal using a flashlight and your hands
- Inspect all equipment in interior compartments
- Ensure **all** water is drained or decontaminate.

If sandpapery bumps, mussels, plant material or gelatinous masses are found that you reasonably believe could be potential AIS, then decontamination is then required. In addition, if standing water is identified in the watercraft, then a standing water decontamination of the those areas could be required.

### Exit Inspection Step-By-Step Procedure - Prevention

Exit Inspections are performed at lakes and reservoirs only. It is critically important to make an additional educational contact with the boater reinforcing that watercraft should be clean, drain and dry in between each use. It also verifies that the boater has followed the proper procedures to clean off the watercraft and completely drain all compartments prior to leaving. Repeat the primary educational message Clean, Drain, Dry and explain why boaters need to do it each time they use their watercraft.

The priority for exit inspections is to apply a seal and receipt to the watercraft. Perform the exit inspection below to ensure the watercraft leaves clean and drained to the best of the inspector's ability.

#### Step 1 - Greet the Boater

- Introduce yourself
- Provide a brief verbal explanation of the purpose of the exit inspection
- Mention the words Clean, Drain, Dry

#### Step 2 - Ensure personal and public safety

- Ask the driver to turn off the engine, put on the parking brake and step out of the vehicle.

#### Step 3 - Initial Assessment

- Record on the Activity Log or mobile app the following information
  - In or Out
  - Boat Type
  - Boat Registration Number
  - Trailer License Plate

#### Step 4 – Ask About Live Aquatic Bait and follow the bait rules for your site.

#### Step 5 – Check for Ballast Tanks

- At prevention locations, the procedure is to have the boater run the ballast pump(s) as long as it takes until no more water comes out of the ballast tank(s).

Step 6 – Perform a rapid visual and tactile entrance inspection of the watercraft, using the acronym HEAD to ensure that all risky portions of the watercraft are inspected.

#### **Hull and Trailer – Rapid Exterior Inspection**

- Look over entire watercraft on both sides of hull and trailer, including through hull fittings.
- Remove any plants or plant fragments that are present.
- Ask the boater to remove the bilge plug to drain the watercraft when inspecting the transom.
- If applicable, have the boater activate the bilge pump.
- If the watercraft has an inboard engine, be certain to inspect the prop, prop shaft and rudder.

#### **Engine or Motor**

- Ask for the outboard or I/O to be lowered.
- Check engine compartments with a flashlight.
- Check the gimbal area of the outboard or I/O with a flashlight
- Check the transom or rear of the watercraft

#### **Anchor and Equipment Checked**

- Ask to see the anchor and anchor rope or chain.
- Visually and physically inspect the anchor and rope or chain for mud, plants and/or AIS.
- Check any additional equipment to ensure all equipment is clean and dry.

#### **Drain and Check Interior Compartments**

For larger craft, you will need to get into the watercraft to inspect interior compartments that could hold standing water (e.g. wells). For smaller craft, you may be able to see without entering the watercraft.

- Ask for permission to board the watercraft and ask the boater to climb in first. Follow the boater into the watercraft in the same way they entered. Be careful to prevent either the boater(s) or inspection staff from falling or getting hurt.
- Ask the boater to open up compartments so you can see the bait wells, live wells, equipment lockers and verifiable ballast tanks. The inspector should work with the boater to remove standing water from the watercraft using a pump, sponge, or towel. Ensure that the compartments are drained to the best of your ability. Remind the boater to dry at home.
- If the watercraft has an inboard engine, be sure to inspect the engine compartment and its bilge and run bilge pump, if applicable.

#### **Step 7 – Apply Seal and Provide Valid Receipt**

- Properly apply a seal to watercraft and trailer.
- Hand the boater a copy of the seal receipt properly filled out.
- Explain that the seal is valid only if the receipt is kept and the seal has remained intact.

#### **Step 8 - Closeout**

- Ask boater to leave the bilge plug out during transport to ensure extra drain time.
- Ask boater to raise the engine or motor to ensure no damage to motor takes place.

- Thank the boater and remind them the importance of Clean, Drain, and Dry.
- Ensure all inspectors are finished looking at the watercraft and that nothing was found.
- Yell “stand clear” to ensure the safety of staff and the public.
- Complete the WID Activity Log or submit the mobile WID app record.

### Exit Inspection Step-By-Step Procedure - Containment

The main focus of containment is to make sure standing water, and adult or settler mussels, do not leave the lake or reservoir on a watercraft. The difference between containment and prevention exit procedures is that at containment reservoirs a **high-risk exit inspection should be performed on watercraft leaving**. Depending on the level of invasions, the priority may be focused on draining standing water and performing standing water decontaminations, or it may be focused on ensuring no settlers/adult mussels, plants, mud or other animals leave the lake or reservoir on or in watercraft by doing full decontaminations.

The goal for containment waters is such that all exiting boats get a minimum of a high-risk inspection and are issued a **seal and a BLUE receipt**. If the watercraft can't be drained during the exit inspection, it should get a standing water decontamination prior to leaving. If adult mussels or other AIS are found, it should get a full decontamination.

However, the ability of containment reservoirs to implement the following procedure is completely dependent on the number of boats at that specific time along with the number of inspection and decontamination points and the complexity of watercraft. As the number of complex boats increase, the ability of the site to perform high risk inspections and standing water decontaminations decrease. Therefore, it stands to reason that more boats will get inspected and decontaminated on slower weekdays than on busy weekends – or at smaller reservoirs versus larger reservoirs – or at reservoirs with more ramps than those with less ramps. Prevention waters and roadside stations need to be on high alert for watercraft that have previously been in containment waters and have not been decontaminated.

Containment locations should issue seals and receipts for exiting boaters. The blue colored receipt provides a visual warning to the next inspector that the watercraft is from a infested, positive or suspect water body. Follow seal removal procedure for containment boats.

If at any point suspect or known AIS are found, or the watercraft can't be drained → send to decontamination.





## Exit Protocol for Boats Exiting Containment Reservoirs:



### IMPORTANT NOTES ABOUT CONTAINMENT STATIONS:

1. Ballast Tanks, I/O Engines and Inboard Engines should get a standing water decontamination leaving the containment water IF they intend to go somewhere else next.
2. If a boater that claimed to be returning to a containment water body and doesn't, the prevention water body they visit next should decontaminate the boat if they have a ballast tank, an I/O, an Inboard or ANY standing water.
3. There are rare occasions when the weather is unsafe for inspectors to be working (e.g. lightning and hail) and therefore large volumes of boaters can leave containment reservoirs without inspection, draining or decontamination. It is imperative that these boats get intercepted and decontaminated when entering the next reservoir. The same is true for ballast boats intending to return to the same location and go somewhere else instead.

## Rules for Standing Water, including Ballast Protocol for Unverifiable Water

Again, it is very important that standing water be drained from watercraft to prevent the movement of microscopic mussel larvae or veligers, plant fragments, diseases and other animals from being transported. Inspectors should pay careful attention to all trailered watercraft that cannot be completely drained and therefore, contain standing water. Zebra and quagga mussel veligers are microscopic and capable of surviving up to 27 days in closed interior compartments.

### There are two types of water on boats:

*Verifiable Water* – This is water in compartments that you can see, feel or visually inspect, such as in wells or bilges. This is most of the water on most of the boats inspectors will encounter.

*Unverifiable Water* – This is water in compartments (mostly ballast tanks) that inspectors cannot see, feel or visually inspect, and they do not know where it is from (undocumented boat).

### Rule #1 –Watercraft from Containment Reservoirs

If the watercraft has been in suspect, positive or infested waters in the last 30 days and has any standing water (including ballast), it should receive a standing water decontamination prior to launch.

### Rule #2 –Boats with Verifiable Water

All watercraft should be clean, drained and dry in between each and every use. Watercraft coming from prevention waters with seals, or undocumented boats, should be clean, drained, and dry. If water is found, have the boater sponge, pump or towel out it out, or decontaminate, prior to allowing launch. On exit from prevention reservoirs, drain to the best of your ability and remind boater to dry.

### Rule #3 –Boats with Unverifiable Water (e.g. Ballast, Inboard and I/O Engines)

- Boats with seals and receipts that are returning to the same location do not need decontamination
- Boats with seals and white receipts moving between prevention locations should be fully pumped out and do not require decontamination in between launches
- Undocumented boats with no seal and receipt should get standing water decontamination.



*Educate all boaters to get seals and receipts when exiting the lake or reservoir!*

## Live Aquatic Bait

### What do the regulations say about live aquatic bait?

Some regulations prohibit live aquatic bait use, while others require that all live aquatic bait be purchased from an authorized bait dealer and must be accompanied by a dated receipt. Inspectors must learn the specific bait rules for your site.

### Out of state bait is typically not permitted for use.

When the boater leaves the WID station, encourage him/her to properly dispose of bait in the trash, never in the water. Completely drain the live/bait well and any other containers. Inspectors may need to sponge or hand pump the water from the live/bait well out so that no water leaves the WID station.

### What options does the angler have if the live aquatic bait is not allowed?

If the live aquatic bait is not allowed, the angler has a few options:

- Leave the bait in the car or truck.
- Dispose of the bait in the trash.
- Go fishing at a different lake or reservoir where that bait is allowed.

## Reporting

Check with the state program before starting a WID station to verify everything is in compliance with state laws and regulations. Some state programs have strict reporting requirements for WID stations.

- Please report any suspect or known AIS to the State AIS Program listed in Chapter 1.
- Please report all mussel boat interceptions to the State AIS Program listed in Chapter 1.

## WIDS Reporting:

Most reporting will be automated through the mobile application in the future. If an inspector suspects that there is an **AIS on a watercraft** (e.g. mussel boats) or in the reservoir (e.g. plants or animals in the reservoir), they should collect the specimen, properly document and report prior to decontamination. See Chapter 5 for detailed procedures regarding suspect watercraft and intercepting “mussel boats”. Inspectors should call their supervisor immediately. Documentation, samples and photographs should be sent in to the appropriate state office within 24 hours.

- Report
- Document
- Collect
- Decontaminate

## Chapter 4 Review

1. Our goal as inspectors for every boat is no \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.

2. Rank the following in order of priority as an inspector (1-5, with one being most important)

\_\_\_ Drain

\_\_\_ Inspect – Access Risk

\_\_\_ Safety

\_\_\_ Educate the boater

\_\_\_ Decontaminate

3. Name three items that are mandatory equipment for an inspector during an inspection?

---

4. Fill in the letter of the correct inspection procedure to the matching definitions below:

*A. Exit Inspection – Containment:*

*B. High Risk Inspection*

*C. Exit Inspection – Prevention*

*D. Entrance or Off-Water Inspection*

\_\_\_ This inspection procedure applies to all trailered, motorized watercraft before entering prevention or containment water bodies.

\_\_\_ This procedure is for boats leaving a prevention lake or reservoir. This inspection ensures that contact has been made with the boater before he/she leaves the boat ramp and verifies that the boat is clean and drained prior to leaving. Make sure the owner pulls all plugs and live wells are empty.

\_\_\_ This procedure is for boats leaving lakes or reservoirs that are positive for AIS. Procedures are focused on high-risk inspections, draining standing water and decontamination.

\_\_\_ This procedure is used on boats found to have a combination of high risk factors including use out of state, use in positive or suspect waters, complex boat structure, dirty, or standing water. This is intended to be a very thorough entrance or exit inspection. These are mandatory for boats leaving containment reservoirs.



6. Circle true or false for the following statements about seals and receipts.
- a. Green means go! True or False
  - b. A seal is proof of prior inspection. True or False
  - c. It will speed up their entry to the next water. True or False
  - d. You do not have to stop at the inspection station and have the seal and receipt verified. True or False
  - e. The watercraft should be allowed to launch if they are returning to the same location, been out of the water for more than 30 days or the watercraft is clean and dry. True or False
  - f. If the watercraft is not clean and dry, it will most likely get re-inspected. True or False
7. What are the five risk factors to look for when inspecting watercraft?
- a. Launched in waters out of state in last 30 days
  - b. Launched in contaminated waters (suspect, positive or infested) in last 30 days
  - c. Boat is dirty/crusty/slimy
  - d. Boat has standing water
  - e. All of the above
8. Which of the following is a way to remember how to do the hands-on part of an inspection?
- a. H.E.A.D. – **H**ull/Trailer, **E**ngine/Motor, **A**nchor and Anchor Rope, **D**rain Interior Compartments
  - b. B.O.A.T. – Bait, Outboard, Anchor, Transom
  - c. F.I.S.H. – Front, Interior, Sails, Handrails
  - d. C.D.D. – Clean, Drain, Dry
9. At containment reservoirs, if the inspector cannot get all water out of the boat upon exit, they should perform a
- 
10. What type of inspection should boats get leaving a containment reservoir?
- a. Entrance Inspection
  - b. Exit Inspection
  - c. High Risk Inspection
11. Which boats should get a mandatory decontamination after boating in a containment reservoir? (circle all that apply)
- a. Boats with verifiable water that inspectors can easily sponge out
  - b. Boat with unverifiable water in a single ballast tank
  - c. A canoe with an electric motor
  - d. A cabin cruiser that has an inboard engine
12. When should inspectors ask about live aquatic bait?
- a. Only when the boater does not have a green seal..
  - b. Only when inspectors see fishing poles on the boat entering the reservoir.
  - c. Every time a boater enters or leaves their location, even when they have a green seal attached.
  - d. Never. Checking for live aquatic bait is not part of the inspection process.

13. Boats with unverifiable water should get a standing water decontamination if they do not have a valid seal and receipt from a prevention reservoir (ballast, I/O, inboards).

True                      False                      (circle one)

14. What should inspectors do if they suspect they have a mussel boat?      (circle all that apply)

- a. Report
- b. Document
- c. Collect
- d. Decontaminate
- e. Panic

## **Day 1 Homework**

1. Memorize the 8-Step Entrance or Off Water Inspection Procedure.
2. Answer and Review the Questions at the End of Chapter 1-4.

# Chapter 5 Decontamination Procedures

Content updated from the *Colorado Division of Wildlife Aquatic Nuisance Species (ANS) Watercraft Decontamination Manual, 2011.*



WRP does not endorse any products or brands pictured or mentioned in this manual/chapter.



Revised January 2016

[www.westernais.org](http://www.westernais.org)





# Chapter 5: Decontamination Procedures

## Table of Contents

Why watercraft decontamination? .....	111
When will decontamination be required? .....	111
What does watercraft decontamination generally consist of? .....	111
What types of decontaminations will I do? .....	112
Where should watercraft decontamination stations be located? .....	113
When should a portable water containment pad be used? .....	113
What are the requirements for a decontamination unit? .....	113
What are the standard operating procedures for a decontamination unit? .....	114
• <a href="#">Step-by-Step Operating Instructions for Trailered HydroTek Decontamination Units</a> .....	114
What is included in the standard decontamination protocols? .....	116
What is the protocol for standing water decontamination? .....	117
• <a href="#">What are pump temperature ratings?</a> .....	118
• Examples of live well and aerator pump diagrams .....	119
• <a href="#">Step-by-Step Procedure for Standing Water Decontaminations</a> .....	120
• Interior Compartments .....	120
• Outboard Motors and Inboard/Outboard Engines .....	121
• Inboard Engines and their Bilges .....	123
• Ballast Tanks .....	125
What is the protocol for plant decontamination? .....	127
• <a href="#">Step-by-Step Procedure for Plant Decontamination</a> .....	127
How to do a Bait Treatment .....	129
What is the protocol for live aquatic bait treatment? .....	129
• <a href="#">Step-by-Step Procedure for Bait Treatment</a> .....	130
Full Decontamination for Suspect or Confirmed Mussels or Other AIS .....	131
• <a href="#">Step-by-Step Procedure for Full Decontamination</a> .....	134
What if the boater will not allow an inspection or decontamination? .....	139
What options does the boater have if the decontamination unit is broken or if our station doesn't have a decontamination unit? .....	140
State Standard Forms .....	140
• High Risk Inspection Form .....	141
• Documentation and Vessel Decontamination Form (page 1–4) .....	142
• Inspection and Decontamination Seal Receipt .....	146
• Watercraft Inspection And Decontamination Activity Log .....	147
Winterizing Procedures for Decontamination Units: .....	148
• <a href="#">Step-by-Step Instructions for Winterizing Trailered HydroTek Units</a> .....	148
Decontamination Unit Photo Glossary .....	151
Acknowledgements .....	155

## Why watercraft decontamination?

Invasive species, such as zebra or quagga mussels, are able to travel great distances over land by “hitchhiking” on watercraft. They can survive up to 30 days out of water depending on temperature and/or humidity. Through a comprehensive education, inspection and decontamination program, we can stop the spread of these costly invasives in the West. Once detected on watercraft, zebra or quagga mussels and other aquatic invasive species (AIS) can safely and effectively be killed and removed from the watercraft by certified personnel. The Western Regional Panel, and most western states, follow the Uniform Minimum Protocols and Standards (UMPS), which requires the use of hot water with high or low pressure to decontaminate boats, motors/engines, trailers, personal gear, and other equipment. The objective of decontamination is to **kill** and **remove**, to the extent practical, all visible mussels or suspected AIS. Killing AIS prevents establishment of new populations as a result of watercraft/equipment transfer.

## When may decontamination be required?

Most inspections will not result in a decontamination being performed. In fact, less than 2% of inspections resulted in decontamination from 2009–2015.

However, there are many different circumstances that may result in a decontamination being performed:

- If zebra or quagga mussels are found attached to a watercraft.
- If any other AIS is positively identified or suspected on a watercraft.
- If suspect unidentifiable bumps are detected on a watercraft.
- If the watercraft is from a suspect, positive or infested water and has any water in it and has not been decontaminated.
- If the watercraft has unverifiable water (e.g. ballast tank, inboard or inboard/outboard engine) and does not have a seal and receipt.
- If the watercraft or trailer has plants attached that can't be removed by hand.
- If the watercraft has live aquatic bait without a valid receipt.
- If the inspector deems a decontamination is necessary.

## What does watercraft decontamination generally consist of?

Watercraft decontamination consists of a very hot water rinse or spray at high or low pressure. There are no soaps, bleaches or chemicals used or recommended at this time. The hot water kills the mussels and other AIS, and the high pressure spray removes them from the watercraft.

The general recommendation is to use 140°F water at high pressure (3,000 psi) to decontaminate the hull and 140°F water at low pressure to decontaminate motors/engines. Interior compartments are decontaminated with 120°F at low pressure to avoid damaging pumps.

Figure 1 tells us that a 140°F (60°C) hot water rinse for ten seconds to each spot will kill all adult mussels. A 176°F (80°C) rinse for five seconds to each spot will kill all adult mussels. However, higher temperatures are not recommended for the protection of the watercraft.

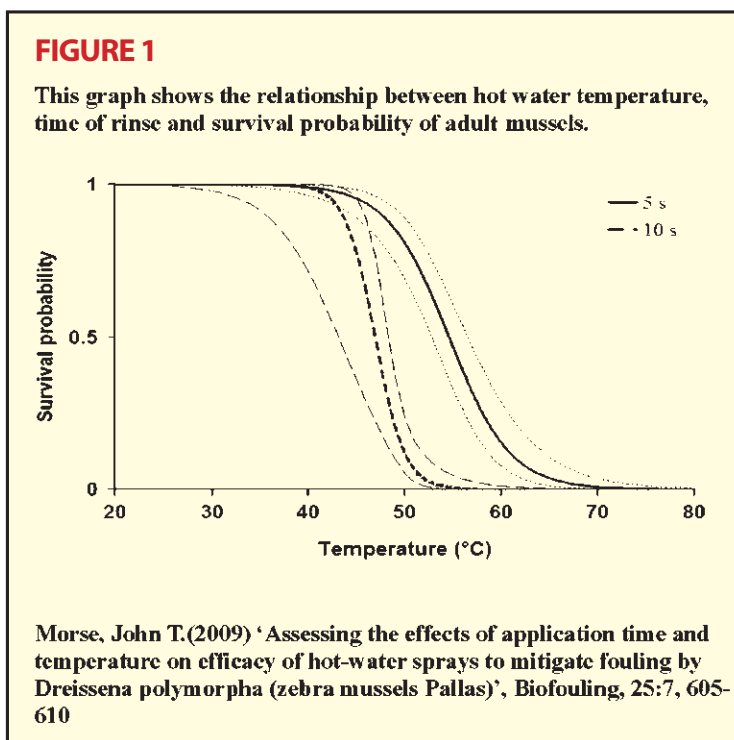
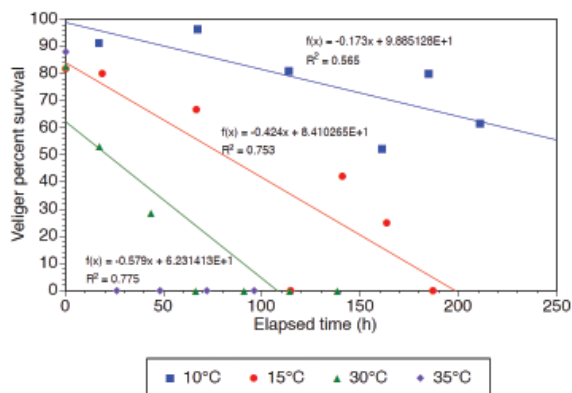


Figure 2 shows that there was 0% survival of quagga mussel veligers in water temperatures of 95°F (35°C). Therefore, the reduced temperature of 120°F for interior compartment standing water decontaminations for the protection of the watercraft is more than sufficient to kill veligers in those interior compartments. This research also reinforces the

importance of standing water decontaminations for boats leaving positive waters, even if no adults or settlers are found on the vessel, because it shows that veligers can live in standing water for up to 24 days at 50°F (10°C), 8.5 days at 59°F (15°C) or 4.5 days at 86°F (30°C).

**FIGURE 2**

The graph below shows the combined effects of time and temperature on the percentage survival of quagga mussel veligers held at 10, 15, 30, and 35°C (50°F, 59°F, 86°F and 95°F).



Christopher D. Craft and Christopher A. Myrick, Ph.D. (2011) Evaluation of Quagga Mussel Veliger Thermal Tolerance Final Report, prepared for Colorado Division of Wildlife, Invasive Species Program, p. 19.

## What types of decontaminations will I do?

There are four different types of AIS decontaminations. Each of these will be described in great detail later in the chapter.

Decontaminations performed must be documented on the *Watercraft Inspection And Decontamination Activity Log* under the “Results” headings.

### Standing Water Decontamination

This protocol is performed to kill veligers or other microscopic AIS in standing water that can't be fully drained from the watercraft. This decontamination applies to interior compartments that contain water or have equipment that have come in contact with the water body. The interior compartments include but are not limited to: live wells, bait wells, bilge areas, and ballast tanks. The equipment includes but is not limited to: anchor, mooring and anchor lines, PFD's, swim platform, inflatables, down-riggers, planing boards, water skis, wake boards, ropes, ice chests (used for bait or for holding fish), fishing gear, drift socks, bait buckets, and stringers. Standing water decontamination also includes flushing the outboard motor, inboard/ outboard engine, or inboard engine of a watercraft.

Standing water decontamination should be required if the:

- Watercraft did not get a decontamination when leaving a suspect, positive or infested water body and has **ANY** water in it.
- Watercraft has unverifiable water (ballast, I/O or inboard engines) and does **NOT** have a valid seal and receipt.
- If the watercraft is unable to be fully drained and the water can't be sponged, towed or pumped out.

The standing water decontamination protocol requires that pump temperature ratings are taken into account when flushing or rinsing a compartment for standing water. Some, but not all, marine pumps are rated to withstand temperatures above 140°F. If the pump is rated to a lower temperature and is flushed with 140°F water, damage could occur. For this reason, the protocol requires turning the temperature down to 120°F for all interior compartment flushes or standing water decontaminations. Standing water decontaminations of engines are performed at 140°F at low pressure.

### Plant Decontamination

This decontamination is performed whenever plant material cannot be removed from the watercraft or trailer by hand. This decontamination is localized and only requires using 140°F hot water for 15 seconds on the areas where plant material is located.

### Bait Decontamination

This decontamination prevents the potential transfer of AIS being used as bait, or as contaminants in standing water in a bait well or bucket. Strict step-by-step procedures must be followed if the bait receipt is older than seven days. If the bait is from out of state, or the bait is not permitted, the bait should be disposed of in the trash. If the boater has no receipt, and the bait is allowed, follow the bait decontamination procedure found later in this book.

### Full Decontamination for Suspected or Known Mussels or Other AIS

This protocol is performed when adult or settler mussels, unidentifiable bumps or other AIS are detected on the watercraft. This decontamination is the most complicated and ensures that the boat has been completely decontaminated inside and out. The inspector must complete a high risk inspection form prior to and after the decontamination, in addition to the four-page *Documentation and Vessel*

*Decontamination Form.* The inspector must take photos and samples for identification prior to doing a full decontamination.

In rare instances, you may require the assistance of law enforcement personnel to decontaminate or impound a boat. A few of the situations that would require a qualified peace officer to assist include an uncooperative boat owner, an unavailable or broken decontamination unit, or instances in which an inspector simply can't get a fully encrusted watercraft decontaminated in one day.

### **Where should watercraft decontamination stations be located?**

Ideally, watercraft inspection, draining, and decontamination should be located in the same general area. The location should be far enough from the water or boat ramp that drained bilge/ballast/well water and water from the decontamination unit cannot flow into the water body. This site is ideally on an access road where all boats must pass prior to launch and after exiting the boat ramp. The site should be far enough away from the ramp to allow users, especially overnight campers, to move through the interior of the state wildlife area or park without going through the inspection and decontamination station unnecessarily.

Decontaminations should be conducted “high and dry,” away from the water. The minimum requirements for decontamination unit placement include:

- Must be in a location where the water does not run off into the reservoir or lake.
- Must be on semi-permeable surface (gravel or dirt) where water absorbs into the ground or evaporates off.
- Must be in a location where the inspector can maintain visual and auditory contact with the inspection station (which in many instances is the boat ramp but not always).
- Must be in secure facility where the decontamination unit is locked up over night or when inspectors are not present.
- Must be protected from the elements—rain, wind, excessive cold.
- Must be in compliance with all waste water disposal requirements in local and state laws and regulations.



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### **When should a portable water containment pad be used?**

If a suitable site (high and dry, away from the water source, and on a semi-permeable surface) is not available, you will be required to use a water containment pad to ensure waste water is collected and properly disposed of.

If using a portable water containment pad, follow the protocol below for set up:

#### ***Roll out containment pad***

- 1—Note how the pad is rolled up, so you can fit it back in the bottom bunk of the trailer.
- 2—Set up the waste collection pad so that the driver can drive straight on, without excessive wheel turning.

- 3—Ensure drainage to the waste

water pump location on pad.

- 4—Ensure the waste water pump location is close to trailer.

#### ***Set up air pump***

- 1—Connect the air pump to the battery.
- 2—Turn on the air pump to inflate the outer rim of pad quickly.
- 3—Remove the air pump and store it in the trailer.

#### ***Set up waste water pump***

- 1—Put a small rock or piece of wood under one side of the pump to keep the pump from sucking up the mat.
- 2—Plug waste water pump into outlet on the side of the trailer.

Run the hose from pump into waste water recovery tank (or to drain area if not using tank)

### **What are the requirements for a decontamination unit?**

- The unit needs to have an adjustable thermostat up to 180°F (able to maintain 140°F for long periods of time).
- Minimum flow of five gallons per minute
- Preferred pressure of 3,000 psi (minimum 2,500—maximum 3,500)



## What are the standard operating procedures for a decontamination unit?

**Be sure to follow the manufacturer's operating procedures specific to your unit.**

### Step-by-Step Operating Instructions for Trailered Hydro Tek Decontamination Units

#### *Before start up*

**1—Check pump oil.** Check pump oil by locating the yellow oil dip stick on top of the pump. ➔

**2—Check fluid levels.** Check engine oil by locating the yellow dip stick on the engine. Check gasoline and diesel fuel levels in the tank. ➔

**3—Roll out the hose** all the way and double check all quick connects.

**4—Connect the water supply and turn water on.** Maintain an adequate supply of water using a 3/4 inch I.D. hose with a pressure between 25 and 60 psi. Burner power switches should be off before starting. If the decontamination unit is tank fed, be sure there is water in the tank and valve is switched for supply tank feed. **Do not run dry.**

#### *Operation*

**1—Starting.** Pull out choke and turn the key to start position only until engine starts. Push the choke in immediately after engine starts. ➔

**2—Purge air from system.** Squeeze the trigger on the spray gun until a constant stream of water comes out. (Purging works best with the nozzle removed from the wand and/or dual wand in the low-pressure mode).

**3—Select desired nozzle.** Connect a 40° nozzle securely to the spray wand. Hold the gun firmly, squeeze the trigger for high-pressure spray. ➔

**CAUTION: gun kicks back—hold with both hands.**



## Step-by-Step Operating Instructions for Trailered Hydro Tek Decontamination Units (cont.)

**4—Start the burner.** To create hot water on high pressure washers equipped with heat exchangers, release the trigger on the gun, turn the burner to the “on” position, and turn the thermostat to the desired temperature.

Squeeze the trigger on the spray gun and the burner will begin heating the water. The burner will stop heating the water whenever the water spray is off or if the temperature setting is exceeded.

Be sure to test the water temperature prior to decontaminating to ensure you are working at the correct temperature for that procedure (either 140°F or 120°F).

**5—Bypass mode.** System will go into bypass mode when the machine is left running and the trigger gun is released. Bypass mode is when the inlet water coming into the pump re-circulates through the unloader across the pump head. If left in bypass too long—more than five minutes—friction created by the movement of the water will begin to heat the water at a rapid rate. If equipped with a bulk water tank, water can be bypassed back through the tank allowing for a larger volume of water to be re-circulated through the pump head, thus reducing heat on the pump seals.

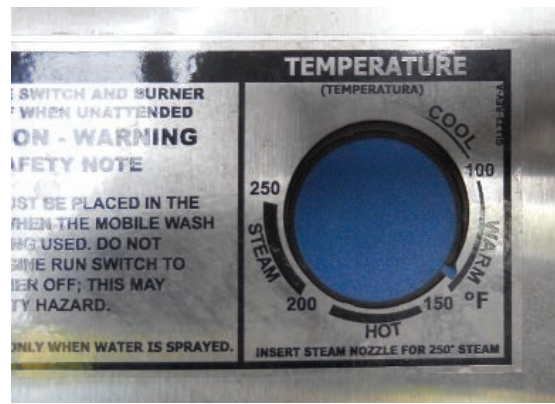
**WARNING:** *Do not leave in bypass for longer than five minutes to prevent the pump from overheating. Shut off the unit when not spraying water.*

**6—Perform appropriate decontamination protocol.**

### Shut down

**WARNING:** *Cool down the burner before shutting off the decontamination unit.*

- 1—Turn the burner switch to the off position.
- 2—Squeeze the trigger on the spray gun until the water becomes cool.
- 3—Turn the engine switch off.
- 4—Turn off water supply.
- 5—Squeeze the trigger to release any trapped pressure in discharge hose.
- 6—Drain water out of the hose and roll up.
- 7—Disconnect attachments and store properly.





## What is included in the standard decontamination protocols?

To ensure that zebra and quagga mussels and other AIS are killed and removed, watercraft decontamination protocols include:

### *Safety!*

Ensure staff and the public's safety by wearing all personal protective equipment including a heat resistant suit, taking care to avoid slips, trips, falls, and burns. Use caution when operating the high pressure spray wand.



### *Education*

Explain to the boater why decontamination is important and why we are doing it. You can direct them to the *Western States Boat Inspections* rack card and have them read it in a safe location while you perform the decontamination.

### *Removal*

All mud, plants, water, and organisms must be removed from the vessel.



### *Decontamination*

Thoroughly flush the interior compartments and spray the exterior of the watercraft with hot water.

- All discharge ports must be flushed with **120°F** water at **low pressure** for one minute or until the water back flushes.
- All interior compartments that may hold water, including, but not limited to: live/bait wells, ballast, bilge areas and intakes must be flushed at **low pressure** with **120°F** water.
- If a bilge pump is present, then it must be run until the bilge appears to be empty.
- The lower unit of the engine should be thoroughly flushed with **140°F** water at **low pressure** until exiting water temperature is 140°F.
- The Gimbal area must be sprayed with **low pressure 140°F** water for 2 minutes.
- The exterior of the watercraft and trailer must be thoroughly decontaminated with **140°F** water with **low** and **high pressure**.

***Note:** Low pressure can be achieved with the wand by removing the nozzle and turning the handle away from you.*

When doing a full decontamination for suspect or known AIS, be sure to fill out all required paperwork, take photos before and after decontamination, collect samples and do a high risk inspection both before and after the decontamination.



### Bait

Depending on the location and type of live aquatic bait, the inspection or treatment will vary. See the bait treatment section.

### Report

Report a mussel boat to your supervisor. In addition, mail a copy of the four-page *Documentation and Vessel Decontamination Form*, two *High Risk Inspection Forms* and all photos to your supervisor and the State AIS Coordinator.

All other decontaminations are documented on the *Watercraft Inspection And Decontamination Activity Log* or the mobile application.

### Seals and Receipts

If the boat is leaving your site following any decontamination, apply an inspection seal and give the boat operator a seal receipt. Provide the boater with the pink copies of forms to document the decontamination. Write in notes section if anything wasn't working—for example, if a flush wasn't done because the engine battery was dead.



### What is the protocol for standing water decontaminations?

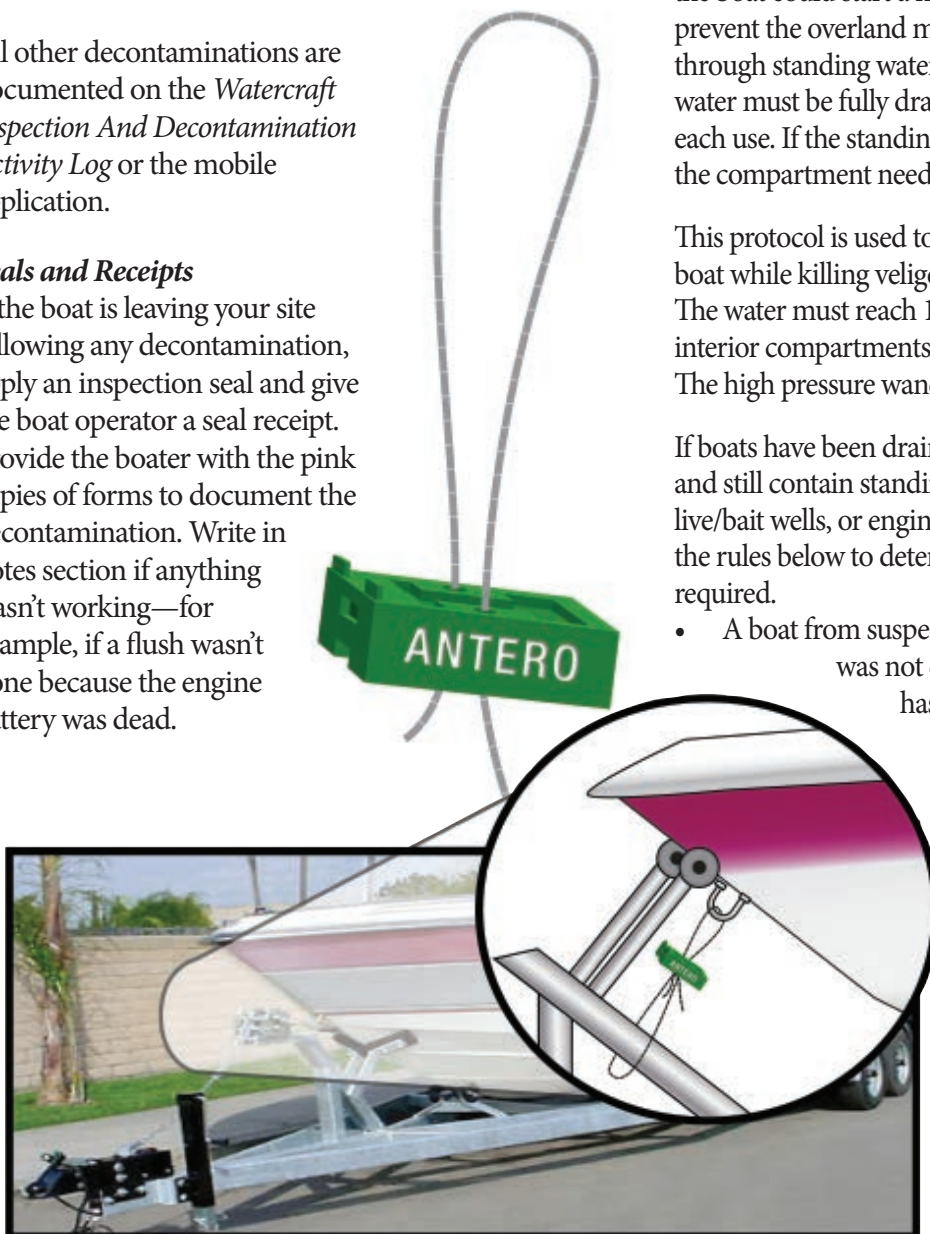
Zebra and quagga mussels start off life as microscopic, free-floating organisms called veligers that are too small to see with the naked eye. They can be transported to new locations in standing water in live wells, bilge areas, and other interior compartments on boats. Mussels aren't the only unseen invasive species. Others, such as the waterflea, are also microscopic

and transported in the water from the lake or reservoir. Small plant fragments that get sucked up in water onto the boat could start a new infestation in another lake. To prevent the overland movement of all invasive species through standing water on boats, the lake or reservoir water must be fully drained out of the boat in between each use. If the standing water cannot be fully drained, the compartment needs to be decontaminated.

This protocol is used to force infested water out of the boat while killing veligers and other AIS in the water. The water must reach 120°F coming out of the boat for interior compartments, or 140°F for engines and motors. The high pressure wand is never used in this protocol.

If boats have been drained to the fullest extent possible and still contain standing water in the bilge, ballast tanks, live/bait wells, or engines, then you will need to follow the rules below to determine if decontamination is required.

- A boat from suspect, positive or infested water that was not decontaminated upon exit, and has not been out of the water for more than 30 days, and has **ANY** standing water present, must be decontaminated. This includes water in ballast tanks, inboards and I/O engines.
- For an undocumented boat (no seal and receipt) with unverifiable water (ballast tanks, inboards and I/O engines), a standing water decontamination is recommended.







- If a boat has small amounts of standing water and the boat has **not** been in suspect, positive or infested waters, you should still get the water out of the boat. The inspector should have a small pump and sponges/towels available at the inspection station to assist with the draining of boats. If using these tools does not ensure a fully drained vessel (e.g. gravity emptied live wells with long discharge hoses) then the interior compartments with water remaining should be flushed with 120°F water.

**Be extremely cautious with OUT OF STATE BOATS because some other states do not have extensive sampling programs focused on early detection. We do not know which lakes are or are not infested in those states.**

Interior compartments that may hold water, including, but not limited to live/bait wells, ballast, anchor compartments, bilge areas and their corresponding intake ports, must be flushed with 120°F water at **low pressure**. This can be accomplished by removing the nozzle from the end of the wand or using a diffuser attachment.

Due to our research findings about ballast, bilge, or live/bait well pumps it is important to adjust the temperature of the decontamination unit to 120°F to ensure that no damage is done to the pump during the decontamination process. Please keep in mind that the veligers will die at temperatures that exceed 95°F.

**Note:** Prior to decontaminating interior compartments with pumps, be sure that you have tested the temperature of the water to ensure that your unit is operating at 120°F and verify using a digital thermometer that the water reaches 120°F exiting the boat. Engines and motors are flushed using 140°F low pressure hot water.

## What are pump temperature ratings?

Pump manufacturers were consulted during the drafting of this chapter. In rare occasions, marine transfer pumps could be damaged by the use of hot water temperatures during the decontamination process. More research is needed in this arena. The following is a list of some popular manufacturers, pump types and their recommended temperature ratings. Due to the complexity of pumps and the various brands and ratings, it is required that interior compartments are decontaminated at 120°F with low pressure.

Pump Temperature Rating Table	
Manufacturer	Temperature Rating
Atwood Corporation	130°F
Johnson Pumps of America	170°F
SHURflo Pumps	140°F
ITT Manufacturers	120°F

**Attwood Corporation.** Makers of bilge pumps. Models include: Sahara, Heavy Duty, and Tsunami. They also carry the Tsunami Aerator for live wells. Pumps are rated at 130°F. However, they can withstand 140°F for approximately five minutes before damage may occur.



**Johnson Pumps of America.** All of their pumps are rated for 170°F.





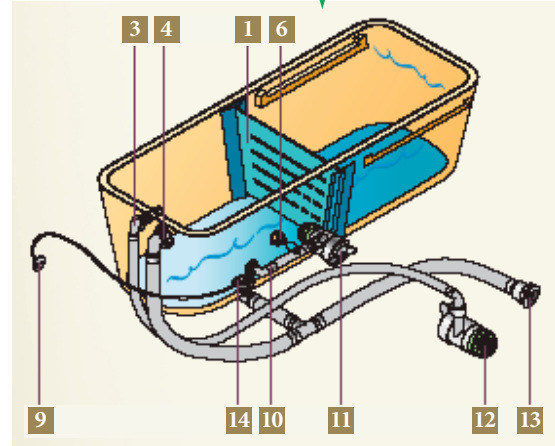
**SHURflo Pumps.** All of their current pumps will tolerate 140°F. However, they will incur damage at temperatures of 145°F and above due to the ABS plastic that they use.

#### ITT manufacturers.

They make Rule pumps. Their pumps are rated for 120°F. Extended exposure at hotter temperatures will cause damage.



This is a **two-pump design**. One pump fills and aerates the well from above the fish while the other recirculates and injects fresh air via the Max-Air system for the oxygenation.



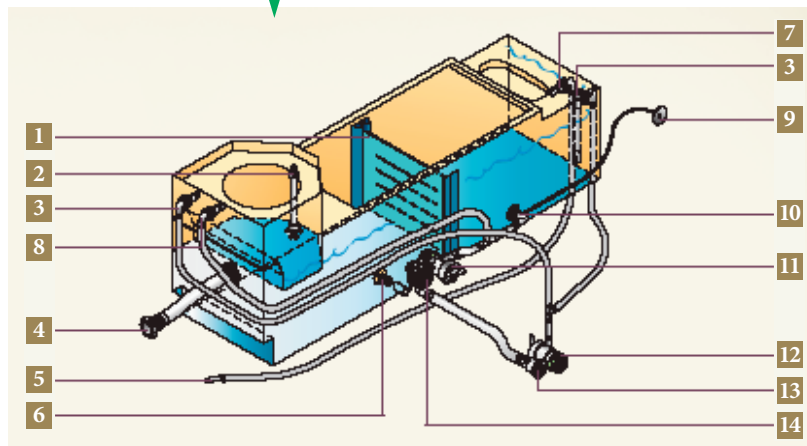
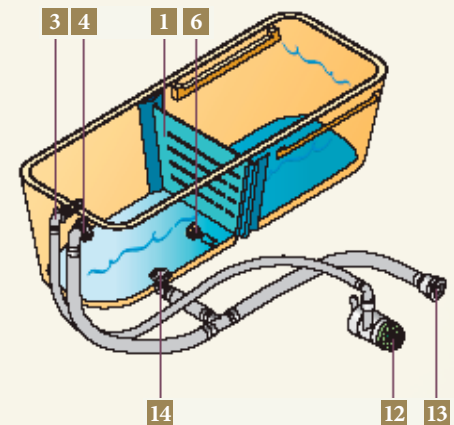
This live well features a **single pump** with a single-switch control. The aerator pump can be run continuously in manual mode or intermittently in automatic mode when equipped with a timer.

#### Examples of live well and aerator pump diagrams

Below are some examples of live/bait wells from the Lund Boat Company. This section is intended to provide decontaminators additional information regarding the complexities of wells.

Only low pressure and 120°F water can be used when decontaminating a live/bait well to ensure no damage is done to any of the numerous parts.

The **ProLong Plus** is designed with a freshwater pickup integrated into the bottom of the hull where it forces a steady flow of water into the live well while the boat is running.



The numbers on the following list refer to individual parts shown in all three diagrams.

- |                                |  |
|--------------------------------|--|
| 1—Removable divider            | 9—Max-Air intake                             |
| 2—Baitwell drain               | 10—Recirculating outlet                      |
| 3—Fill spray head              | 11—Recirculating pump with filtration screen |
| 4—Overflow                     | 12—Aerator pump with filtration screen       |
| 5—Freshwater pickup            | 13—Through-hull drain                        |
| 6—Waterproof light             | 14—Drain with plug                           |
| 7—Freshwater pickup spray head |  |
| 8—Recirculating spray head     |  |

© LUND BOAT COMPANY AND CRESTLINER BOAT COMPANY

## Step-by-Step Procedure for Standing Water Decontaminations

### *Standing Water Decontamination of Interior Compartments*

1—Follow the standard operating procedures for your decontamination unit.

- Check all fluid levels of the decontamination unit. With the trigger squeezed, start the unit and purge the water until it runs clear.

2—Turn on the burner, and measure the temperature of the water. ➔

3—Start the decontamination by placing the tip of the wand (nozzle removed) or the diffuser on the through hull discharge port(s) and flush this for one minute or until the water back flushes. Diffuser attachment shown. ➔

4—Turn off the decontamination unit by turning the burner off first and then turn off the key so that the unit does not stay in the bypass mode too long while you are climbing into the boat to flush the interior compartments.

5—Next, have the boat operator open all interior compartments that need to be decontaminated and remove plugs. Restart the decontamination unit and flush the compartment. Use a thermometer and measure the temperature at the through hull discharge port for that compartment. Continue flushing ➔ until the exit temperature of the water is 120°F.

Be sure to keep the tip of the attachment close to the sides of the compartment to prevent temperature loss. Start at the bow of the boat and work your way to the stern.

6—If equipped, have the boater turn on the discharge pump for the compartment. ➔

7—Turn off the decontamination unit when you have completed decontaminating all necessary interior compartments. Turn the burner off first, run some water through the boiler and then turn off the key. Follow the standard operating procedures for shutting down your decontamination unit.

8—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark “Standing Water Decontamination” under the “Results” section.

9—Remind the boater to dry.





## Step-by-Step Procedure for Standing Water Decontaminations (cont.)

### *Standing Water Decontamination of Outboard Motors and Inboard/Outboard Engines*



Outboard Motor



Inboard/Outboard Engine

All decontamination stations should have at least two models of decontamination mufflers; a type for the newer Mercury engines that threads through the intake ports that are completely open; and another clamp style muff for all other engines.



The following photos show the use of the threaded Mercury mufflers.

1—Attach the hose to the end of the wand (quick connect fitting).



2—Then attach the muff attachment to the hose.





3—Make sure the motor/engine is completely lowered. Place the muffs so that all the intake openings are completely covered. When threading the Mercury muffs, place the wire through the center opening to ensure all openings are covered. ➤

4—Start the decontamination unit following the standard operating procedures.

***Note:** If operating in colder climates, allow the engine to warm up by running water through prior to starting the burner.*

5—Start the water by engaging the trigger. Check to make sure the intake openings are still covered on both sides and that the muffs are tight.

6—Stand clear of the propeller and have the boat operator start the motor/engine in **Neutral**. ➤

***Note:** If the engine is not uptaking water when it is turned on in neutral, turn off the engine and decon unit, and re-adjust the muffs.*

7—Flush the engine until the water temperature is 140°F when measured by a thermometer at the discharge port(s). ➤

8—Have the boat operator turn off the motor/engine.

9—Turn off the decontamination unit by turning the burner off first, run some water through the boiler and then turn off the key. Follow standard operating procedures for shutting down your decontamination unit.

10—Remove the muffs and allow the motor/engine to drain; have boat operator raise and lower the motor/engine twice.

11—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark “Standing Water Decontamination” under the “Results” section.

12—If exiting, apply a seal and give the boater a properly filled out receipt. Remind the boater to dry.

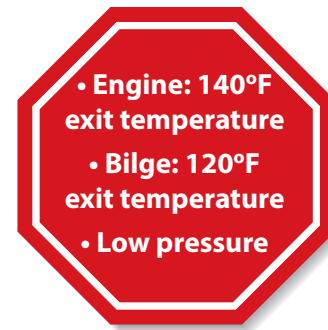


## Step-by-Step Procedure for Standing Water Decontaminations (cont.)

### *Standing Water Decontamination of Inboard Engines and their Bilges*

*Note: Most inboards, but not all, that have the engine in the center of the boat do not have ballast tanks.*

All inboard intakes, which are located on the bottom of the hull directly under the engine, have a cover over the opening that protects the engine from sucking up large particulates. Some inboards have a hose attachment in the engine compartment for decontamination. However, this boat still needs to have hot water flushed between the intake hull fitting and the hose that connects to the engine for thorough decontamination.



1—Attach the hose to the end of the wand (quick connect fitting) and then attach the fake-a-lake attachment.



2—The fake-a-lake must be placed snugly against the bottom of the hull covering the intake port for the inboard.



- 3—Start the decontamination unit following the standard operating procedures.
- 4—Start the water by engaging the trigger.
- 5—Stand clear of the propeller and have the boat operator start the engine in Neutral.
- 6—Flush the engine with low pressure water until the exit temperature of the water is 140°F when measured with a thermometer at the discharge port(s).
- 7—Have the boat operator turn off the engine.
- 8—Turn off the decontamination unit by turning the burner off first and then turn off the key.
- 9—Remove the fake-a-lake from under the boat; disconnect the hose from the wand.
- 10—Flush the bilge with 120°F low pressure water.
  - a. Make sure that the bilge plug, located in the center access area, is **in**.

- b. Add 4–5 gallons of water into the bilge by putting the diffuser down behind the engine next to the floor. ➡

- c. Then **remove** the bilge plug and continue to flush until the exiting water reaches 120°F. ➡

***Note:** The auto float valve bilge pump will come on if you exceed the allowable amount for that watercraft.*

11—Turn off the decontamination unit by turning the burner off first, run some water through the boiler and then turn off the key, and have the boat operator run the pump to assist in water removal. Follow the standard operating procedures for your decontamination unit.

12—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark “Standing Water Decontamination” under the “Results” section.

13—If exiting, apply a seal and give the boater a properly filled out receipt. Remind the boater to dry.





## Step-by-Step Procedure for Standing Water Decontaminations (cont.)

### *Standing Water Decontamination of Ballast Tanks*

**Note:** Most inboards, but not all, that have the engine in the center of the boat do not have ballast tanks.

1—Follow the standard operating procedures for your decontamination unit.

- Check all fluid levels of the decontamination unit. With the trigger squeezed, start the unit and purge the water until it runs clear.

2—Turn on the burner, and measure the temperature of the water.



**Note:** You must first identify which through hull fittings are outlets for ballast tanks and then back flush. Be aware that some through hull fittings for ballast tanks have one way valves so if the water rushes back out, you will not be able to perform the back flush.



3—Once the water temperature reaches 120°F, start the decontamination by placing the tip of the wand or the diffuser on the through hull discharge port(s) and flush this for **one** minute or until the water back flushes.



4—Turn off the decontamination unit by turning the burner off first and then turn off the key so that the unit does not stay in the bypass mode too long while you are changing the attachments.



5—Attach the hose to the end of the wand (quick connect fitting) and then attach the fake-a-lake attachment.





6—The fake-a-lake must be placed snugly against the bottom of the hull covering the intake port for the ballast tank.



7—Start the decontamination unit and then start the water by engaging the trigger.

8—Have the boat operator turn on the intake ballast pump. Fill it up with low pressure or until the exit water temperature reaches 120°F. If there is no ballast tank discharge pump, flush the ballast tanks with 120°F water for at least 2 minutes.



*If you have a “mussel boat” and are doing a full decontamination, fill up each ballast tank and drain with hot water at 120°F.*

*All other scenarios, ballast tanks will be flushed until the decontamination water temperature exiting the watercraft is 120°F.*

9—Have the boat operator turn off the intake ballast pump. Release the trigger to stop the water flow.

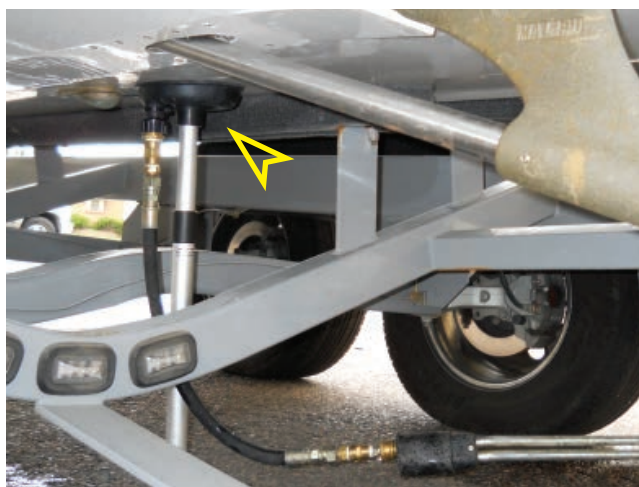
10—Turn off the decontamination unit by turning the burner off first, run some water through the boiler and then turn off the key so that the unit does not stay in the bypass mode too long while you are changing the location of the fake-a-lake.

11—Have the boat operator turn on the ballast tank discharge pump to drain the tank as much as possible.

12—Repeat these steps for every ballast tank.

13—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark “Standing Water Decontamination” under the “Results” section.

14—Remind the boater to dry.



State of Colorado	
INSPECTION AND DECONTAMINATION SEAL RECEIPT	
For use when applying green seals to boats at PREVENTION stations. Provide original to watercraft owner (white) and keep carbon copy (yellow).	
W/D Location:	Mc Phee
Date/Time:	7/17/13 10:30 am
Inspector's ID #:	1147
Vessel Registration (CL #):	CL 2876 LU
Trailer Plate #:	122-ANS
Seal Serial #:	6325173
<b>PROCEDURES PERFORMED (Every line must be checked to be valid)</b>	
Exit (HEAD) Inspection:	<input checked="" type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Exit High Risk Inspection:	<input checked="" type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Full Decontamination:	<input type="checkbox"/> Performed or <input checked="" type="checkbox"/> Not Performed
Standing Water Decontamination:	<input checked="" type="checkbox"/> Performed or <input type="checkbox"/> Not Performed
Plant Decontamination:	<input type="checkbox"/> Performed or <input checked="" type="checkbox"/> Not Performed
Bait Treatment or Decontamination:	<input type="checkbox"/> Performed or <input checked="" type="checkbox"/> Not Performed
<b>HOW TO TREAT A BOAT WITH A GREEN SEAL</b> Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true: 1.) Boat is returning to the same location; or 2.) Boat has been out of the water for more than 30 days; or 3.) Boat has been decontaminated; or 4.) Boat is clean and fully drained. If not, perform an inspection prior to launch.	
<b>NOTES:</b> Ballast Tanks only	
CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!	
Distribution: White—Owner/Operator Yellow—Inspection Location	
1-6/2013-140,000 13-082-12-4/320PYY	

## What is the protocol for plant decontamination?

True aquatic plants are defined as plants that are normally completely or mostly submerged in water and are unable to survive for long periods outside of water. Submerged aquatic weeds are commonly transported via watercraft and trailers, usually by getting tangled around motors, engines, and anchors. Most aquatic weeds can establish new populations with only a tiny fragment of the parent plant. Those tiny fragments can be carried overland on watercraft, trailers, anchors, fishing equipment, water ski equipment, etc. It is the inspectors and the boaters responsibility to ensure plants are not transported on boats.

During the entrance and exit inspection, any plant or plant fragment should be hand removed and properly disposed of away from the lake or reservoir by the inspector or boat operator. However, there may be a situation when plant material is caught between the hull of the vessel and the trailer bunk or roller, or is wrapped around the propeller or transducer, and can't be completely removed by hand.

It should become mandatory for the boat inspector to decontaminate those areas of the vessel where the plant fragments remain. **Remember**—heat kills.

### Step-by-Step Procedure for Plant Decontamination

- 1—Start the decontamination unit using the standard operating procedures for your unit.
- 2—Apply low pressure 140°F water directly to the plants or plant fragments for 15 seconds.
- 3—Decontaminate areas where plants are located and can't be removed:

*If plant material is found on a boat with ballast tanks, the tanks must be flushed to eliminate possible fragments within.*

- a. **Trailer's carpeted bunk.** Use 140°F water at low pressure. Move the wand/diffuser **slowly** along the length of the bunk. Keep the tip of the wand/diffuser close to the bunk to maintain an even temperature.
- b. **Trailer's frame, and rollers.** Use 140°F water at high pressure. Move the wand/diffuser **slowly** along the length of the trailer. Keep the tip of the wand/diffuser close to the trailer to maintain an even temperature.



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- c. **Propeller.** Use 140°F water at high pressure. Be thorough and remove 100% of the plant material. In order to avoid too much spray when decontaminating the propeller, the boat decontaminator can turn the wand handle one quarter turn away from him/herself to lower the pressure.



- d. **Transducer.** Use 140°F water at low pressure. The wiring and “water wheel” attached to this instrument dictate that low pressure is used in order to prevent damage.



- e. **Interior compartments.** Follow standing water decontamination protocol.

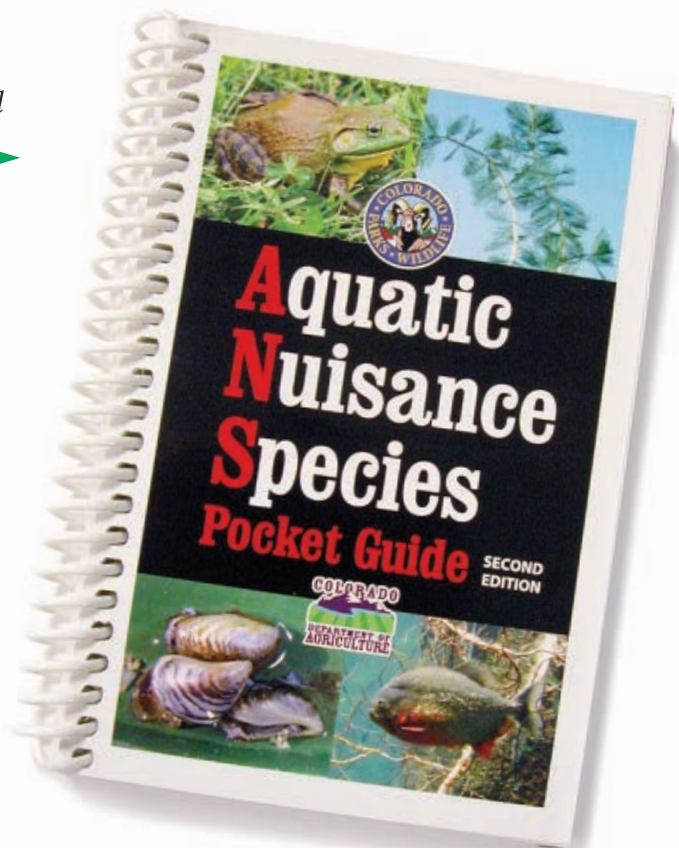
4—Turn off the decontamination unit by first turning off the burner, engage the trigger to run water through the burner to cool it, and then turn off the key. Follow the standard operating procedures.

5—Put a check under the “Results” heading under “Plant Decontamination” on your *Watercraft Inspection And Decontamination Activity Log*.

6—If exiting, apply a seal and give the boater a properly filled out seal receipt. Remind boater to dry.

**Note:** If a boat from a reservoir/lake that is not known to be positive for that plant species (Eurasian watermilfoil for example) comes to your station and has plant material that you believe is an AIS, check with your supervisor for the correct procedures to report AIS and if sample collection is required.

Remove all plant material and put it in the trash. If a complete removal is not possible, decontaminate the sections of the watercraft that are affected.



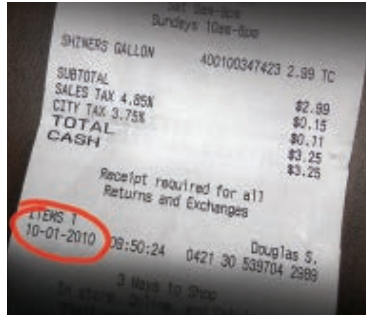
## How to do a Bait Treatment

Please ask your supervisor when a bait treatment would be required based on laws and regulations.

### What is the protocol for live aquatic bait treatment?

If a vessel has live aquatic bait in a container or a well with standing water, be sure to check the *Watercraft Inspection and Decontamination Activity Log* box under “Live Bait” in the “Determine Risk Factors” section. Then ask the boater for a bait receipt.

In places where live bait is allowed, the inspection or treatment will vary depending on the location and type of bait.



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© JOHN WOODLING

### ***Out-of-state bait is typically not permitted for use.***

When the boater leaves your waters, encourage them to properly dispose of bait in the trash, never in the water. Completely drain the live/bait well and any other containers. You may need to sponge or hand pump the water from the live/bait well out so that no water leaves your site.

***Note: Any live aquatic bait purchased from an out-of-state dealer is illegal and must be disposed of in the trash. Do not allow it to be used at your water body.***

**What options does the angler have if the live aquatic bait is not allowed?** If the live aquatic bait is not allowed, the angler has a few options:

- Leave the bait in their car or truck.
- Dispose of the bait in the trash.
- Go fishing at a different lake or reservoir where that bait is allowed.





## Step-by-Step Procedure for Bait Treatment

As much as possible, **minimize transferring water to the holding container**. The live/bait well or container must be drained and decontaminated using 120°F low pressure water before the bait is restocked in the container that has been re-filled with water from the lake the boat will be entering. If a decontamination unit is unavailable or not working properly, completely dry out the original container using a paper towel or cloth. If exiting, do not allow water from any reservoir, especially a containment reservoir, to leave in a bait bucket or live well.



1—Using a net, transfer the bait to a holding container filled with reservoir water. Minimize the transfer of water from the original container as much as possible. ➡



2—Drain the original container or compartment (e.g. live well). ➡



3—Follow standard operating procedures for your decontamination unit.

- Check all fluid levels of the decontamination unit. With the trigger squeezed, start the unit and purge the water until it runs clear. Turn on the burner, and measure the temperature of the water.

4—Flush the live/bait well, compartment or container with low pressure until the exit temperature of the water reaches 120°F. Be sure to keep the tip of the attachment close to the sides of the compartment to prevent temperature loss. If using the wand, be sure to **remove the nozzle** so that you are using low pressure. ➡

- If there is a discharge pump for the live/bait well, you can use a thermometer and measure the temperature exiting the through hull discharge port for that compartment.



5—Follow standard operating procedures for shutting down your decontamination unit.

- Turn off the decontamination unit; turn the burner off first, run some water through the boiler and then turn off the key.

6—Whenever possible, water from the reservoir the boat is entering should be used for restocking the bait. Do not use tap water, as chlorinated water can kill live aquatic bait.

7—If exiting, the container or well water will be replaced with water from a sealed container or non-chlorinated source. Do not allow water from any reservoir, especially a containment reservoir, to leave in a bait bucket or live well.

8—Decontaminate all nets, buckets and equipment used with low pressure 120°F water at the end of the procedure.



## Full Decontamination for Suspect or Confirmed Mussels or Other AIS

If you suspect that you have found mussels or another AIS, or you know you have a mussel boat, the following are the steps that you should perform. Any evidence or suspicion of adult or juvenile mussels should require a full decontamination.

Remember it is required that you **report, document, collect, and decontaminate**. Follow these documentation and reporting procedures and do not allow the boater to leave with mussels or other AIS attached to the boat.

If a watercraft is highly encrusted with zebra or quagga mussels, it can be quite difficult to effectively remove all the mussels from the watercraft. It can take several days for the dead mussels' byssal threads to detach and for gravity to pull them out of the watercraft. Always try to remove all mussels from the watercraft prior to releasing it. If a boat is too highly infested to fully remove mussels at the inspection station, make arrangements for the boat to be serviced at a certified marina or marine business prior to releasing it. If the boat owner is not cooperative, you will need the assistance of law enforcement to quarantine or

*CA local jurisdictions must call the CAF&G regional scientist contact immediately. Either a regional biologist or a warden will respond.*

- 140°F high pressure on exterior
- 140°F low pressure on engine
- 120°F low pressure in interior

impound the watercraft or escort it to a certified marina or marine business to ensure all mussels are dead and removed.

### Report

Report your suspected AIS discovery immediately by calling your supervisor and the State AIS Coordinator.



© BRAD HENLEY

The initial report can be brief but should include the following essential information:

- Date/Time
- Location—**both** the boat's current location and the boat's history (i.e. waters visited in the last 30 days)
- Home state of the boat
- Location where the boat became infested
- Suspected species of AIS
- Name of Reporter (Inspector)
- Name and contact information of the boat owner

### Document

**1**—Once mussels are found (or suspect mussels or other AIS), a full decontamination is required. You must first conduct a **high risk inspection** on the vessel to identify all areas that are infested on the vessel.

You must fill out the *High Risk Inspection Form*. Be as accurate as you can and inspect and complete every item on the form that applies to the boat.

**2**—Take **digital photos** of the entire boat before, during (if possible), and after the decontamination. Always have extra batteries ready for the camera, set the date on the camera, and practice taking close up photos.

- Start taking photos at the hull number and work your way around the boat to end at the same CL number. Note any damage or AIS on the boat. If available, take a video of the boat while you walk around it. Both video and photos are desired. Photograph an overview of the entire boat, the registration number, the rear of the boat (to verify the name of the boat), and note any areas where existing damage occurs on the boat, and the area(s) of the boat where the specimen is detected. End with a photo of the CL number. The standard number of photos is 10, but there is no maximum.
- For boats with gimbals (inboard, inboard/outboard, stern drives, etc.) get good photos of gimbal boots from several angles to document before and after condition.
- Take **digital photos** of the AIS specimen. Take both far away and close up photos of the specimen on the boat. Take photos of where the specimens are located on the boat. There may be numerous places, so be

sure to photograph each location. Change your camera setting to close up mode (icon is a flower) and then take close up photos. If specimen is a zebra or quagga mussel try to get a good close up photo of the byssal threads. Next, place a common object such as a pencil or penny next to the specimen and photograph the combination to demonstrate the relative size of the specimen.

- **You must photograph the vessel after decontamination** in the same fashion and same locations as you photographed the boat before the decontamination.

**3**—Fill out the *Documentation and Vessel Decontamination Form* or document using your forms or the regional mobile application.

- Under "Reason for Decontamination," be sure to check all that apply in the following list:
  - Possible Mussels (bumps that look like mussels)
  - Zebra/Quagga Mussels Visible
  - Other (for suspected AIS).

Use the *Documentation and Vessel Decontamination Form* to document your findings:

who, when, where, and how it was found, etc. Be sure to document any existing damage on the boat in the area provided.

Be sure to document specifically where the boat has been launched, along with where it became infested and any waters it was launched in since infestation. If it is not known where it became infested, document all waters the boat visited in the last six months. Record as much information about the boat's history as possible.

**4**—Use the *Documentation and Vessel Decontamination Form* to document the placement of the AIS on the vessel. Again, be as accurate as possible when filling out this form.

### Collect

After photographing the vessel, collect several **samples** of the mussels or suspect AIS and fill out the *Documentation and Vessel Decontamination Form*. Make sure your focus on the many close up digital photos is clear before the samples are detached from the boat. If possible, take photos of the collection being done. Be sure to properly preserve the samples. Check with your supervisor for the proper procedures for



sample collection and where to send the sample for final identification. An example procedure is listed below for reference:

- 1—Only fill 50% of the vial with 70% ethanol or grain alcohol, **not rubbing alcohol**. (Alcohol for samples can be ordered through the program office. Even trace amounts of chlorine from tap water, or “de-chlorinated” tap water can completely destroy sample DNA.) Remove as many specimens as will fit in the specimen vial without the vial overflowing. It is acceptable to send more than one vial.
- 2—Tightly seal the vial. Write the date/location/contact information on the vial’s label. If there are numerous areas of attachment on the boat, take samples from those numerous areas as well.
- 3—Place the vials in a Ziploc® bag and wrap in bubble wrap to help protect it during shipment.



© PHOTO BY JIM GREFFLY

- 4—Complete the lower half of page 4, the *Suspected AIS Collection Form For Watercraft Inspection Stations* and place in the padded envelop with the sample(s).
- 5—FedEx the envelope ASAP (within 24 hours) to the appropriate laboratory and notify them the sample is being shipped..

## **Decontaminate**

For a full decontamination, all parts of watercraft that has come into contact with the water body must be exposed to hot water at the appropriate temperature and pressure to ensure the AIS are killed and removed.

Similar to inspection, it is critically important that you perform full decontaminations in a standardized and repeatable fashion every single time. Use the acronym TIME to help you remember the order of a full decontamination. **Use your HEAD to inspect. Take your TIME to decontaminate.**

### **T—Through Hull Fittings**

Flush all discharge ports with 120°F hot water at low pressure for one minute or until the water back flushes.

### **I—Interior Compartments**

Bilge area and pump, live or bait wells and other interior compartments must be flushed with 120°F water at low pressure. This includes soaking all carpets, anchors, ropes, chains, gear, life jackets, fenders, drift socks and other equipment that has come into contact with the water with 120°F water at low pressure.

### **M—Motor or Engine**

The motor must be flushed with 140°F water at low pressure. The gimbal unit on an outboard or I/O must also be soaked. The engine compartment for an inboard must get a standing water decontamination also.

### **E—Exterior**

The hull must be first rinsed with 140°F water at low pressure to kill the AIS, and then sprayed with high pressure to remove the AIS.

The trailer must be sprayed and carpets soaked with 140°F water. If the boat has an inboard engine, be sure to decontaminate the prop, prop shaft, and prop shaft support also.

**Only certified individuals should operate decontamination units.** Personal and public safety should always be top priority. Never allow a member of the public or a non-certified employee to decontaminate a boat. Be sure to document all procedures used to decontaminate the boat, including photographs or videos of the decontamination being performed.. Photograph or take video of the decontamination being performed if more than one staff member is present.



It is required that you decontaminate in the following order:

- a. Flush the **Through hull discharge ports.**
- b. Flush the **Interior compartments on the boat.**
- c. Flush the **Motor/engine.**
- d. **Rinse the Exterior of the boat and trailer** with 140°F water to kill the mussels or AIS. **High pressure spray the hull** or infected areas to remove the mussels or AIS.



© PHOTO BY ELIZABETH BROWN

### Step-by-Step Procedure for Full Decontamination

Once you have reported, completed the paperwork, photographs and sample collection, you are ready to begin the hot water decontamination procedure. Remember the acronym **TIME** to guide you through the procedure:

- 1—Follow the standard operating procedures for your decontamination unit. Check all fluids on the decontamination unit to make sure it is ready to operate.
- 2—Connect the wand to the trigger to the hose. Start the decontamination unit using the proper operating procedures for your unit.
- 3—Check the temperature of the water and adjust the temperature depending on the procedure being performed at that time.
- 4—Before beginning decontamination, follow the boat owner into the boat. Work with the boater to prepare the interior compartments that will be decontaminated. With help from the boat operator, identify the discharge ports for the interior compartments.

### 5—T = Through Hull Fittings

#### Decontaminate the through hull discharge ports.

Press the wand (no nozzle attached) or diffuser up against the opening of the through hull discharge ports and decontaminate each port with 120°F water under low pressure for one minute or until the water back flushes. Turn off the decontamination unit. (Turn the burner off first and then turn off the key.)



## Step-by-Step Procedure for Full Decontamination (cont.)

### 6—I = Interior Compartments

#### Decontaminate the interior compartments.

Reposition the hose and wand to the forward interior compartments. Start the decontamination unit and work from the front to the back of the boat using low pressure 120°F water to decontaminate every compartment that has standing water or has equipment that has come into contact with the water body.

- If the boat has an inboard/outboard or inboard engine have the boater raise the lid of the engine compartment and put the wand behind the engine to decontaminate the floor of this area.
- Turn off the decontamination unit. After all interior compartments have been decontaminated have the boat operator activate the pumps to drain the interior compartments as much as possible.

### 7—M = Motor or Engine

**Decontaminate the motor/engine.** Turn the temperature of the unit to 140°F.

- ***Procedure for outboard motors and inboard/outboard engines.***
  - Have the boat operator lower the motor/engine to a vertical position. Attach the hose to the end of the wand using the quick connect fitting.
  - Attach the muffs to the hose and place over the intake holes on the lower end of the motor/engine.
  - Start the decontamination unit and start the water flowing through the muffs. Check to make sure the intake holes are completely covered. Have the boater start the motor/engine in **Neutral**. Run until the existing water reaches 140°F. Turn off the decontamination unit.
  - The gimbal area of the inboard/outboard engine must be soaked for a minimum of 2 minutes (it is important to do both a top flush and a side flush to ensure 100% mortality) with 140°F water under low pressure to ensure adequate exposure time.



- **Procedure for inboard engines**

- Find the engine inlet: This intake always has a screen cover and is located directly under the engine on the hull. ➔



- Attach the fake-a-lake to the hose. Adjust the fake-a-lake so that it covers the engine intake port. ➔



- Start the decontamination unit and start the water flowing. Have the boater start the engine in **Neutral**. Run until the exiting water reaches 140°F. Turn off the decontamination unit.

- Flush the bilge with 120°F low pressure water.

- a. Make sure that the bilge plug, located in the center access area, is **in**.

- b. Add 4–5 gallons of water into the bilge by putting the wand (nozzle removed) ➔ down behind the engine next to the floor.



- c. Have the boat owner **remove** the bilge plug and continue to flush until the exiting water reaches 120°F. Don't stand in front of the discharge port—be aware the auto flow will come on. ➔





## Step-by-Step Procedure for Full Decontamination (cont.)

- On an inboard engine, the strut bearing and the rudder port must be decontaminated.
  - a. Flush the strut bearing with low pressure. Remove the adult mussels with plastic scrapers and then flush with low pressure 140°F. Use high pressure if attached mussels are found.
  - b. Flush the rudder port.



### 8—E = Exterior

#### Decontaminate the exterior of the hull and trailer.

First, remove adult mussels with plastic scrapers or other tools. Next, rinse the hull and trailer with 140°F hot water at low pressure to kill the AIS.

Connect the 40° nozzle with the quick connect to the end of the wand so you can use high pressure spray to remove the AIS. Start the decontamination unit. Keep the wand at a 45° angle and work methodically in one direction. Do not use the wand to “scrub” the hull. Keep the tip of the wand approximately 6–12 inches of the hull and trailer as you move around the boat. Water temperature decreases approximately 15 to 20° per foot of distance when sprayed from a power nozzle.



**WARNING:** Use low pressure on all carpeted areas, decals, electrical connections, gimbal area on the inboard/outboard engine, interior compartments, transducers, and depth sounders and their wiring.





On trailers, be sure to decontaminate the openings of the tubular frames.



Turn off the decontamination unit. Turn the burner off first, run some water through the boiler and then turn off the key. Follow the standard operating procedures for your unit.

**9**—The gimbal area of the inboard/outboard engine must be decontaminated for two minutes with 140°F water under low pressure to ensure adequate exposure time.

**10**—Following full decontamination, give the boat some time to fully **drain the water**. In most cases of badly infested vessels, dead mussel shells will be released from the vessel and will drain out in the water following decontamination.

- If mussel shells are still coming out of the areas draining or can be seen in interior compartments, you will need to **re-flush** those areas to get the mussels out of the vessel.
- Some jurisdictions may require a mandatory or voluntary dessication or drying time for infested watercraft following decontamination.

**11**—Conduct a **final high risk inspection** of the vessel using the *High Risk Inspection Form*. Be sure to check all areas that were previously noted as infested prior to inspection. Also check all other areas of the boat to be sure that there are no mussels (dead or alive) remaining on the vessel. Be as accurate as possible when checking the numerous areas of the boat. If staff allows, it is preferable that the second high risk inspection following decontamination is done by someone other than the person who did the initial inspection and decontamination.

- a. If there's any evidence that mussels or other AIS remain—begin decontamination again!
- b. If it's a highly encrusted watercraft you may consider quarantining or impounding the watercraft (if your legal authority allows for that) to allow the byssal threads to release and the mussels to be removed by subsequent decontaminations. You may also want to consider sending the boat with an escort to a certified marine business for servicing. If the boater is not cooperative with these options and you feel they are necessary, you may require the assistance of a qualified peace officer to order the quarantine or escort the watercraft to the dealer.



**12**—Be sure to **provide the boater copies** of the *High Risk Inspection Forms* and *Decontamination Form*.

**13**—**Within 24 hours**—email the photos of the AIS specimens. If you have the ability to scan the forms please email them also. Mail in the *High Risk Inspection forms* and *Documentation and Vessel Decontamination Forms* to your supervisor or their designee.

**14**—**Apply a seal** and give the boat operator the top copy of the seal receipt. Be sure to fill out all procedures that were and were not performed on the seal receipt.

- Remind the boater to fully dry.

**15**—Be sure to mark “Full Decontamination” under the “Results” section on the *Watercraft Inspection And Decontamination Activity Log*, and enter the seal code of the seal applied.

**16**—If known, notify the lake or reservoir inspection station where the boater plans to launch next.

**17**—If know where the boat has launched since becoming infested, notify those lake managers or state coordinators.

### **What if the boater will not allow an inspection or decontamination?**

The goal is to gain the boater's support of the program and process. Do everything that you can to get the boater's approval to inspect the boat and decontaminate. If the owner is unwilling to cooperate, you will need the assistance of law enforcement officers to order decontamination, impound, or quarantine a boat.

#### ***Guidelines concerning impoundment***

- If a boater is entering a water body and there is no evidence of mussels or other AIS on the boat, and the boater refuses an inspection, the boat should be turned away but not impounded.
- If the boater is leaving a suspect, positive or infested water body and the boater refuses an inspection, then the boat should be inspected

prior to launching in another water body. If the boat owner is not compliant, call law enforcement to impound the vessel until proper inspection and/or decontamination can be performed.

- If suspected or known mussels or other AIS are present on a boat and the boater will not consent to an inspection or decontamination, or if decontamination equipment is not available or working, then the boat should be impounded until decontamination can be performed.

**Do not let an infested vessel leave the inspection station without a peace officer escort if it is infested or you suspect it is infested! If you are not able to detain the vessel until law enforcement can arrive, be sure to have all of the boater's information and a physical description of the boater, the watercraft, and the towing vehicle so an officer can follow up.**





**What options does the boater have if the decontamination unit is broken or if our site doesn't have a decontamination unit?**

Possession of zebra mussels, quagga mussels or other AIS is illegal in most states. A boat cannot be allowed to transport live zebra or quagga mussels or any AIS. If there is a reasonable belief that the watercraft has AIS present, call the nearest peace officer (e.g. Wildlife Manager, Park Ranger, County Sheriff, etc.) and call your supervisor. Options include:

- Quarantine the boat on site until a working decontamination unit can be brought there.
- Escort the boat to the nearest decontamination station.
- As an absolute last resort for a boat with standing water and **no** confirmed or suspected mussels or AIS, you could direct the boater to the nearest decontamination station, although this option is not preferred.

Watercraft inspection and decontamination stations are placed at various locations throughout the state and western U.S.



**State Standard Forms**

The following pages contain the standard example forms used by the Colorado Parks & Wildlife and their partners.



# State of Colorado

Inspection/Sample #: 

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--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

  
Water Code                      Date (month, day, year)                      Boat Registration Number

## HIGH RISK (ANS) INSPECTION FORM

For use before and after a Full Decontamination.

Inspection Location: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Vessel Registration #: \_\_\_\_\_ Vehicle Tag #: \_\_\_\_\_ Trailer Tag #: \_\_\_\_\_

### REASON FOR HIGH RISK INSPECTION and FULL DECONTAMINATION: (check all that apply)

- ☐ Zebra or Quagga Mussel Infested Boat
- ☐ Suspected ANS: \_\_\_\_\_
- ☐ Known ANS: \_\_\_\_\_
- ☐ Other: \_\_\_\_\_

### CHECK ALL PARTS OF WATERCRAFT WHERE AN ANS IS DETECTED OR SUSPECTED (H.E.A.D.)

#### ☐ Vessel Exterior: Hull

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Entire hull              | <input type="checkbox"/> Transducers           | <input type="checkbox"/> Pitot tubes           |
| <input type="checkbox"/> Transom                  | <input type="checkbox"/> Depth sounders        | <input type="checkbox"/> Water intakes/outlets |
| <input type="checkbox"/> Water holding pockets    | <input type="checkbox"/> Recessed bolts        | <input type="checkbox"/> PWC—foot recesses     |
| <input type="checkbox"/> Trim tabs (top and bot.) | <input type="checkbox"/> Through hull fittings | <input type="checkbox"/> Lights                |

#### *Sailboats:*

- ☐ Centerboard box
- ☐ Rudder and transom
- ☐ Keel
- ☐ Fittings

#### ☐ Vessel Exterior: Trailer

- |   |  |  |   |  |
|---|--|--|---|--|
| <input type="checkbox"/> Rollers, bunks, pads | <input type="checkbox"/> License plate | <input type="checkbox"/> Trailer lights      | <input type="checkbox"/> Trailer wiring   | <input type="checkbox"/> Trailer axles |
| <input type="checkbox"/> Trailer springs      | <input type="checkbox"/> Fenders       | <input type="checkbox"/> Pockets and hollows | <input type="checkbox"/> Wheels and tires | <input type="checkbox"/> Hangers       |

#### ☐ Engine or Motor

- |   |  |  |   |
|---|--|--|---|
| <input type="checkbox"/> Exterior housings      | <input type="checkbox"/> Propulsion system | <input type="checkbox"/> Prop., shaft supports | <input type="checkbox"/> Water intake/outlets   |
| <input type="checkbox"/> Rudders                | <input type="checkbox"/> Propeller shaft   | <input type="checkbox"/> Gimbel area           | <input type="checkbox"/> Anti-Cavitation plates |
| <input type="checkbox"/> Propeller and assembly | <input type="checkbox"/> Lower unit        | <input type="checkbox"/> Propeller guards      |   |

#### ☐ Anchor and Equipment

- |  |   |   |   |
|--|---|---|---|
| <input type="checkbox"/> Anchors and anchor rope/chain | <input type="checkbox"/> Drift sock(s)          | <input type="checkbox"/> Waterfowl decoys | <input type="checkbox"/> Float cushions/belts |
| <input type="checkbox"/> Rope and equipment lockers    | <input type="checkbox"/> Motor well             | <input type="checkbox"/> PFD's            | <input type="checkbox"/> Water skis and ropes |
| <input type="checkbox"/> Bait and live wells           | <input type="checkbox"/> Internal ballast tanks | <input type="checkbox"/> Nets             |   |

#### ☐ Drain Interior Compartments

- |  |  |  |   |
|--|--|--|---|
| <input type="checkbox"/> Bilge                                       | <input type="checkbox"/> Bait and live wells                                     | <input type="checkbox"/> Ballast tanks | <input type="checkbox"/> Drain motor or engine lower unit |
| <input type="checkbox"/> Drain inboard engine compartments and bilge | <input type="checkbox"/> Drain water cooled generators, swamp coolers with plugs |  |   |

### INSPECTION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:

Inspected by (print full name and inspector ID #): \_\_\_\_\_

Inspected by (signature): \_\_\_\_\_



# State of Colorado

Inspection/Sample #: 

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Water Code                      Date (month, day, year)                      Boat Registration Number

## (ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM (pg. 1)

For use on Watercraft with Identified or Suspected ANS

- ☐ Call Law Enforcement Officer if boat owner is not willing to submit boat to required decontamination

### VESSEL/OWNER INFORMATION

Inspection Location: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Vessel Registration #: \_\_\_\_\_ Vehicle Plate #: \_\_\_\_\_ Trailer Plate #: \_\_\_\_\_

Vessel Owner/Operator Name: \_\_\_\_\_

Vessel Owner/Operator Date of Birth: \_\_\_\_\_

Vessel Owner/Operator Address: \_\_\_\_\_

Vessel Owner/Operator Phone Number and Email: \_\_\_\_\_

### REASON FOR FULL DECONTAMINATION

- ☐ Possible Mussels (bumps that look like mussels)—Location(s) on boat \_\_\_\_\_
- ☐ Zebra/Quagga Mussels Visible—Location(s) on boat \_\_\_\_\_  
Estimated # of Mussels Present (check box): ☐ <10    ☐ 10–100    ☐ >100
- ☐ Other: \_\_\_\_\_

### SPECIMEN COLLECTION AND REPORTING PROCEDURES

- ☐ **Photos:** Take digital photo closeups of ANS **before** sample is detached from the boat  
Photos taken (take several for all 3 if possible):  
☐ **Before**    ☐ **During**    ☐ **After** Decontamination  
Photo #'s/notes: \_\_\_\_\_
- ☐ **Write description** on page 2 of findings: who, when, where, and how it was found; if the suspected mussels were attached to a surface or not; and all locations the boater has been in the last 6 months. Describe any existing damage to vessel.
- ☐ **Email** photos and description immediately to:  
Elizabeth.Brown@state.co.us
- ☐ **Sample:** Carefully remove mussels or suspected ANS. Place samples in a sample jar with ethanol provided in the station's sampling kit.  
Overnight samples to CPW AAHL-ANS, 122 E. Edison Street, Brush, CO 80723
- ☐ **Decontaminate**—do not allow the boat to leave until complete.  
☐ Quarantined    ☐ Impounded
- Comments: \_\_\_\_\_  
\_\_\_\_\_

### DECONTAMINATION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:

**(Vessel must be reinspected using the High Risk (ANS) Inspection Form)**

Decontaminated by (print State Certified Decontaminator # and name): \_\_\_\_\_

Decontaminated by (signature): \_\_\_\_\_

**(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM (pg.2)**

**Inspection/Sample #:**

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Water Code
Date (month, day, year)
Boat Registration Number

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]

# State of Colorado

Inspection/Sample #:          -              -               
Water Code      Date (month, day, year)      Boat Registration Number

## (ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM (pg.3)

VESSEL EXTERIOR: HULL (check all that apply)	Mussels	Vegetation	Other (describe)
<input type="checkbox"/> Entire Hull	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trim Tabs (top and bottom of hinges)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Through Hull Fittings	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Motor Well	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Transom	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Transducers	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Pitot Tubes	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Depth Sounders	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Water Intakes	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Water Outlets	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Lights	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Water Holding Compartments (pockets, etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Foot Recesses—PWC	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Centerboard Box—Sailboat	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Rudder and Transom—Sailboat	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Keel—Sailboat	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Fittings—Sailboat	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other (describe below):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
VESSEL EXTERIOR: TRAILER (check all that apply)	Mussels	Vegetation	Other (describe)
<input type="checkbox"/> Trailer Rollers and Bunks	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer License Plate	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Lights	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Wiring	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Axles	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Springs	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Fenders	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Pockets and Hollow Spaces	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Trailer Wheels and Tires	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Hangers	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other (describe below):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
ENGINE OR MOTOR (check all that apply)	Mussels	Vegetation	Other (describe)
<input type="checkbox"/> Exterior Housings	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Propeller and Assemblies	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Propeller Shafts	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Propeller Shaft Supports	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Propeller Guards	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Rudders	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Propulsion Systems	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Lower Units	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Gimbal Areas	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Water Intakes and Outlets	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Anti-Cavitation Plates	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other (describe below):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
INTERIOR COMPARTMENTS AND EQUIPMENT (check all that apply)	Mussels	Vegetation	Other (describe)
<input type="checkbox"/> Anchors and anchor rope/chain(s)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Ropes and Lines	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Water Pump Systems	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Bait and Live Wells, Internal Ballast Tanks	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Equipment and Rope Lockers	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Personal Gear: Ski Gloves, Diving Gear, Clothing and Footwear	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Floats: Float Belts, PFDs, Float Cushions, Water Weenies, Torpedoes, Tubes, Inflatable Pontoons, etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Water Skis and Ropes	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Fishing and Hunting Equipment: Nets, Downriggers, Decoys, Blinds, Drift Socks, and other gear that has entered the water	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Evaporative Coolers	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other (describe below):	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

DISTRIBUTION: White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife    Yellow—Inspection Location    Pink—Owner/Operator

4/2014    14-EB2-2422/3079-14

# State of Colorado

Inspection/Sample #: 

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Water Code                      Date (month, day, year)                      Boat Registration Number

## (ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM (pg.4)

### Specimen Collection and Shipping Instructions

1. Collect specimen carefully to obtain entire organism. Use clean, sterile tools to prevent contamination.
2. Place specimen in screw-capped sample vials.
3. Immediately fill vial (with specimen) with 70% ethanol.
  - a. Only fill 50% of vial with 70% reagent alcohol to cover specimen and seal closed vial with electric tape to prevent leakage.

*Note:* Trace amounts of chlorine from tap water, or “dechlorinated” tap water can completely destroy sample DNA. Do **not** use formaldehyde.
4. Write the date, boat registration number and authorized location directly on the sample tube with alcohol resistant permanent sharpie marker.
5. Place sample tubes in Ziploc bag and wrap in bubble wrap.
6. Place Ziploc bag and the completed form below in bubble mailer or padded box.
7. Overnight sample to CPW ANS, 6060 Broadway, Denver, CO 80216—ASAP (within 24 hours).
8. Email [Invasive.Species@state.co.us](mailto:Invasive.Species@state.co.us) to notify CPW that the sample is being shipped
9. If you have questions, call (303) 291-7295.
10. Remember to disinfect all collection tools by soaking them with 140°F hot water or storing them in acidic acid or vinegar solution.

▼ Remove bottom half of page and include in mailer with vials being shipped to CPW for analysis.

### SUSPECTED (ANS) COLLECTION FORM FOR WATERCRAFT INSPECTION STATIONS

Authorized Agent's Name: \_\_\_\_\_

Inspector ID Number: \_\_\_\_\_ Email: \_\_\_\_\_

WID Station Supervisor Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Email: \_\_\_\_\_

WID Authorized Location Name: \_\_\_\_\_

Address: \_\_\_\_\_

Date and Time of Collection: \_\_\_\_\_ Watercraft Registration Number: \_\_\_\_\_

Trailer Plate Number: \_\_\_\_\_ Watercraft Green Seal Code: \_\_\_\_\_

#### REASON FOR COLLECTION (check all that apply)

- ☐ Visual ID of ANS    ☐ Bumps on Boat/Trailer    ☐ Plants on Boat/Trailer    ☐ Unidentifiable Organic Material
- ☐ Zebra or Quagga Mussels Attached

#### LOCATION OF SUSPECTED ANS PRIOR TO COLLECTION

- ☐ Watercraft Hull    ☐ Motor    ☐ Live Well    ☐ Anchor    ☐ Bilge    ☐ Watercraft Interior
- ☐ In Lake/Reservoir    ☐ Other: \_\_\_\_\_

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

▼ Do Not Write Below Line: **For Lab Use Only**

Date Received at ANS Lab: \_\_\_\_\_ Unique ID #: \_\_\_\_\_

Date Identified: \_\_\_\_\_ Notes: \_\_\_\_\_

Technician: \_\_\_\_\_ Further Analysis Needed: \_\_\_\_\_

Collector Contacted with Results: \_\_\_\_\_



## State of Colorado

### INSPECTION AND DECONTAMINATION SEAL RECEIPT

For use when applying green seals to boats at PREVENTION waters.  
Provide original to watercraft owner (white) and keep carbon copy (yellow).

W/D Location: _____
Date/Time: _____
Inspector's ID #: _____
Vessel Registration (CL #): _____
Trailer Plate #: _____
Seal Serial #: _____

<b>PROCEDURES PERFORMED (Every line must be checked to be valid)</b>	
Exit (HEAD) Inspection: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Exit High Risk Inspection: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Full Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Standing Water Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Plant Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Bait Treatment or Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	

**HOW TO TREAT A BOAT WITH A GREEN SEAL**  
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:

**NOTES:**

1. Boat is returning to the same location; or
2. Boat has been out of the water for more than 30 days; or
3. Boat has been decontaminated; or
4. Boat is clean and fully drained.

**If not, perform an inspection prior to launch.**

**CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!**

Distribution: White—Owner/Operator Yellow—Inspection Location  
1-6-2013 - 140,000 13.1B2-13-4-0320P13



## State of Colorado

### INSPECTION AND DECONTAMINATION SEAL RECEIPT BOOK

13.1B2-13-4-0320P13

1-6-2013 - 440,000

## State of Colorado

### INSPECTION AND DECONTAMINATION SEAL RECEIPT

For use when applying green seals to boats at CONTAMINATED waters.  
Provide original to watercraft owner (blue) and keep carbon copy (yellow).  
**This receipt only valid for State Parks presumption if watercraft was decontaminated.**

W/D Location: _____
Date/Time: _____
Inspector's ID #: _____
Vessel Registration (CL #): _____
Trailer Plate #: _____
Seal Serial #: _____

<b>RETURNING BOAT</b>	
<input type="checkbox"/> Yes <input type="checkbox"/> No	

<b>PROCEDURES PERFORMED (Every line must be checked to be valid)</b>	
Exit (HEAD) Inspection: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Exit High Risk Inspection: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Full Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Standing Water Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Plant Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	
Bait Treatment or Decontamination: <input type="checkbox"/> Performed or <input type="checkbox"/> Not Performed	

**HOW TO TREAT A BOAT WITH A GREEN SEAL FROM A CONTAMINATED WATER**  
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:

**NOTES:**

1. Boat is returning to the same location; or
2. Boat has been out of the water for more than 30 days; or
3. Boat has been decontaminated.

**If not, perform an inspection to check for standing water.**

- If there is no standing water and the boat is clean and dried, allow launch.
- If any standing water is found, a standing water decontamination is required before allowing launch.

**CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!**

Distribution: Blue—Owner/Operator Yellow—Inspection Location  
1-6-2013 - 65,000 13.1B2-13-4-0320P13



## State of Colorado

### INSPECTION AND DECONTAMINATION SEAL RECEIPT BOOK

1-6-2013 - 65,000

13.1B2-13-4-0320P13

## WATERCRAFT INSPECTION AND DECONTAMINATION ACTIVITY LOG

[illegible]

**Distribution:** White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife  
Yellow—Inspection Location

## Winterizing Procedures for Decontamination Units

Follow the winterization instructions for your decontamination unit. An example is below.

### Step-by-Step Instructions for Winterizing Trailered Hydro Tek Units

#### Objective

To winterize the units without the need to drain the water tank. This allows units to be kept at remote sites and “ready” with the necessary water to perform decontaminations when the water temperature is dropping below freezing during working hours or overnight.



#### Materials Needed

- Two gallons of RV/Marine antifreeze
- One 2–3 gallon plastic container/tank
- One three-way valve
- Adapters, barbed fittings, Teflon® tape, and clamps for attaching tank and valve to hoses
- Bulkhead for plastic container if needed

An example of container with bulkhead and 3-way valve.



The function of the three-way valve is to have the smaller antifreeze supply isolated from the water supply. The operator is able to “switch” back and forth between the water supply and antifreeze by turning the handle 90° as shown.



Valve position for antifreeze



Valve position for water

#### Install a 3-Way Valve if One is Not Already on Unit

1—Cut water supply line about 20 inches from the filter.

2—Attach water supply line to three-way valve.





## Step-by-Step Instructions for Winterizing Trailered Hydro Tek Units (cont.)

3—Cut other side of supply line and attach to valve.



4—Cut about **five inches** of hose and attach the antifreeze container to the third port of the three-way valve.



### Winterize the Decontamination Unit

1—Roll out **six feet** of pressure hose and secure the trigger in the **open** position.



2—Fill the container with two gallons of antifreeze.



3—Start up Hydro Tek unit and run the pump (no heat) until the colored antifreeze comes out of the gun. Shut down unit following the standard operating procedures.



**Note:** When switching the valve back to the water supply for decontamination, it is possible to recycle the two gallons of antifreeze which is in the machine and hose before the water begins to flow.





4—Connect supply hose and store with trigger in elevated position for winter to avoid antifreeze siphoning out.

5—Be sure to drain the water tank at the end of the season before storing in a secure location.



#### *To Operate a Winterized Unit:*

Begin by recycling the antifreeze into a clean container. When the water runs clear the unit is ready to use. It may be possible to re-use the antifreeze. A winterizing kit can also be used. This kit allows the decontamination unit to be winterized for protection. However, if it needs to be used for a decontamination, the operator just turns the yellow handle 90°, starts the unit (**no heat**) and recycles the antifreeze back into the red container. The unit is then ready to go. When finished with the decontamination, the operator turns the yellow handle back to the position shown in the photo and runs the unit (**no heat**) until the pink colored antifreeze comes out of the spray gun.



## Decontamination Unit Photo Glossary

**Burner on/off switch**—This switch activates the burner to heat the water. Squeeze the trigger on the spray gun and the burner will begin heating the water. It will stop firing whenever the water spray is off or if the temperature setting is exceeded. After turning the switch off, be sure to run water through the system to cool the boiler. ➡



**Choke**—When first starting the decontamination unit, pull the choke out and turn the key until the engine starts. Push the choke in immediately after the unit starts. ➡



**Diffuser**—This attachment connects directly to the spray gun and is used to decontaminate discharge ports, soak carpeted areas on the boat and/or trailer and standing water flushes for any interior compartments. It provides low pressure and a rubber tip to prevent scratching any surface. ➡



**Dual lance wand**—This attachment connects directly to the spray gun. The other end has a quick connect fitting so that a nozzle or connecting hose can be “quickly” attached by pressing down the outer ring and pressing the “other half” of the quick connect fitting into its center. The handle, when turned clockwise, directs the water through the lance with the quick connect fitting only. If a nozzle is attached the water exiting the wand will be at high pressure. The handle, when turned counter clockwise, directs the water through both lances and lowers the pressure of the water. A dual lance wand can be used for low pressure standing water flushes if there is no nozzle attached and the water is exiting both lances. ➡





**Fake-a-lake**—This attachment is used for decontaminating inboard engines and ballast tanks. It has a telescoping leg and the hose attachment threads into the connection on the “plunger,” joining the fake-a-lake to the hose to the wand.



**Hose for connecting attachments**—This six foot hose has a quick connect fitting that connects to the end of the wand. The other end threads into the fake-a-lake or muff attachments needed for a decontamination.



**Muffs**—Muffs are used to decontaminate the lower unit of an outboard motor or inboard/outboard engine. The muffs pictured at the top of the photo are used for all new models of the outboard motor and inboard/outboard Mercury engines that have intake ports that are open. The lower muffs are used on all other outboard motors and inboard/outboard manufacturer's engines.

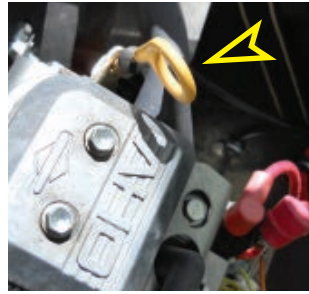


**Nozzle and nozzle storage**—The Nozzle Storage area shows the degree of the nozzle written below the nozzle and its spray pattern is shown above the nozzle. The preferred spray pattern is 40°. Nozzle color and degrees can vary by manufacturer. A nozzle is attached to the end of the wand with the help of the quick connect fitting. Be sure the quick connect “clicks” into place when attaching the nozzle. Point the wand and nozzle towards the ground when you first engage the trigger to start the water. This is a safety issue and will ensure that no one or nothing will be hurt or damaged if the nozzle blows off the wand.



**Note:** All red colored nozzles (0°) have been removed and should never be used for boat decontaminations. The 15° nozzles are also not recommended.

**Oil dip-stick for the decontamination unit's engine**—This should be checked prior to every use. Use 30-weight detergent oil to keep the oil reservoir topped off.



**Oil dip-stick for the decontamination unit's pump**—This should be checked prior to every use. Pump oil is used to keep the oil reservoir topped off.



**Quick connect fitting**—This fitting comes in two parts. The part that is attached to the end of the wand has to have the external circle pressed down before the “male” portion of the fitting can be inserted. The external circle then must “click” in place to make a proper connection.



**Spray gun with trigger**—This photo of the gun has the trigger “wired” open due to unit having been winterized. The wand or the diffuser attachment thread directly onto the gun.



**CAUTION:** *The spray gun kicks back when the trigger is engaged—hold with both hands.*

**Thermometer**—Thermometers are invaluable to the decontamination process. It is used to initially test the temperature of the water prior to the decontamination. It is also used to check the exiting water temperature when performing a standing water decontamination for interior compartments and engine flushes.





**Thermostat**—The thermostat allows the water temperature to be adjusted so that different decontamination temperature protocols can be adhered to by the inspector. Every machine's temperature is different depending on the altitude of its location and the temperature of the water in the tank. Be sure to test the temperature of the water with a digital thermometer prior to beginning and during all decontaminations.



**Winterizing kit for trailered Hydro Tek units**—This kit allows the decontamination unit to be winterized for protection. However, if it needs to be used for a decontamination, the operator just turns the yellow handle 90°, starts the unit (**no heat**) and recycles the antifreeze back into the red container. The unit is then ready for decontamination. When finished with the decontamination, the operator turns the yellow handle back to the position shown in the photo and runs the unit (**no heat**) until the pink colored antifreeze comes out of the spray gun.



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## Chapter 5 Decontamination Procedures Review Questions

1. The goal of decontamination is to \_\_\_\_\_ and \_\_\_\_\_ AIS from a vessel/or trailer.
2. Although it is rare, we sometimes use chemicals to kill AIS during decontamination. True or False
3. What are the four types of decontamination and what are they used for?
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
4. Why is the location important when we perform decontaminations?  
\_\_\_\_\_
5. Put the following in the correct order when performing a full decontamination.
  1. \_\_\_\_\_ a. Document
  2. \_\_\_\_\_ b. Decontaminate
  3. \_\_\_\_\_ c. Collect
  4. \_\_\_\_\_ d. Report
6. According to the AIS protocols, which boat should get decontaminated?
  - a. A boat from a positive/suspect water from last weekend that is completely dry everywhere.
  - b. A boat from a positive/suspect water from 90 days ago with 2 gallons of water in an oily bilge.
  - c. A boat from a positive/suspect water from 21 days ago with standing water.
  - d. A boat from out of state that has no standing water.
7. When performing a flush of an I/O or outboard motor, always be clear of the prop and ask the boater to start the boat in: (circle one) a. drive b. neutral c. reverse.
8. What are the temperature requirements for decontamination?
  - a. Interior Compartments = 100°F; Exterior = 160°F
  - b. Interior Compartments = 120°F; Exterior = 140°F
  - c. Interior Compartments = 140°F; Exterior = 180°F
  - d. Interior Compartments = 180°F; Exterior = 200°F

9. What order is recommended for a **full decontamination** of a boat?
- Hull, trailer, engine, back of boat, interior compartments, anchor
  - Through hull discharge ports, interior compartments, motor/engine, rinse exterior and trailer, then high pressure hull and trailer.
  - Engine, trailer, interior compartments, hull, back of boat, anchor
  - Anchor, back of boat, trailer, hull, engine, interior compartments
10. How long do you back-flush discharge ports with low pressure, 120°F water?
- \_\_\_\_\_
11. How long do you decontaminate plants with low pressure, 140°F water?
- \_\_\_\_\_
12. How long do you flush the gimbal area with low pressure, 140°F water?
- \_\_\_\_\_
13. How often do you need to start up and use your decontamination unit if not performing regular decontaminations?
- \_\_\_\_\_
14. Which one of these boats should get a standing water decontamination if they have no seal and receipt?  
(circle all that apply)
- Ski boat with an inboard/outboard engine
  - Wakeboard boat with a ballast tank
  - Fishing boat with an outboard motor
  - Ski boat with an inboard engine
15. What attachment do you use to flush a ballast tank or inboard engine?
- Diffuser
  - Dual Lance Wand
  - Fake-a-Lake
  - Engine muffs